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FIRST REPORT

OF THE

Gr. Brit. — Commissioners —

ROYAL COMMISSIONERS

ON

TECHNICAL INSTRUCTION.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE

1882.

[C.—3171.] *Price 4d.*

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COMMISSION TO INQUIRE INTO TECHNICAL INSTRUCTION.

VICTORIA R.

VICTORIA, by the Grace of God of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith; To Our Trusty and Well-beloved Bernhard Samuelson, Esquire, Fellow of the Royal Society; Henry Enfield Roscoe, Esquire, Doctor of Laws, Fellow of the Royal Society; Philip Magnus, Esquire, Bachelor of Arts, Bachelor of Science; John Slagg, Esquire; Swire Smith, Esquire; and William Woodall, Esquire, Greeting!

WHEREAS We have deemed it expedient that a Commission should forthwith issue to inquire into the Instruction of the Industrial Classes of certain Foreign Countries in technical and other subjects, for the purpose of comparison with that of the corresponding classes in this Country; and into the influence of such Instruction on manufacturing and other Industries at home and abroad.

NOW KNOW YE, that We, reposing great Trust and Confidence in your knowledge and ability, have authorised and appointed, and do by these Presents authorise and appoint you, the said Bernhard Samuelson, Henry Enfield Roscoe, Philip Magnus, John Slagg, Swire Smith, and William Woodall, to be Our Commissioners for the purposes aforesaid.

And for the better effecting the purposes of this Our Commission, We do by these Presents give and grant unto you, or any three or more of you, in case you shall think fit so to do, full power and authority to call before you such persons as you shall judge likely to afford you any information on the subject of this Our Commission.

And We do by these Presents Will and Ordain that this Our Commission shall continue in full force and virtue, and that you, Our said Commissioners, or any three or more of you, may from time to time proceed in the execution thereof, and of every matter and thing therein contained, although the same be not continued from time to time by adjournment.

And We further Ordain that you, or any three or more of you, may have liberty to report your proceedings under this Our Commission, from time to time if you shall judge it expedient so to do.

And Our further Will and Pleasure is that you do, with as little delay as possible, report to Us under your hands and seals, or under the hands and seals of any three or more of you, your opinion upon the several matters herein submitted for your consideration.

And for your assistance in the execution of these Presents We have made choice of Our Trusty and Well-beloved Gilbert Redgrave, Esquire, to be Secretary to this Our Commission.

Given at Our Court at Saint James's, the Twenty-fifth day of August, One thousand eight hundred and eighty-one, in the forty-fifth year of Our reign.

By Her Majesty's Command,
(Signed) W. V. HARCOURT.

ROYAL COMMISSION

ON

TECHNICAL INSTRUCTION.

FIRST REPORT.

MAY IT PLEASE YOUR MAJESTY,

WE, your Commissioners, have found it expedient to conduct our inquiry into the instruction of the industrial classes as far as possible under the following heads, namely:—

1. The instruction of the proprietors and superior managers engaged in industrial pursuits.
2. That of the foremen } engaged therein.
3. That of the workmen } engaged therein.

We have, during our visits to France and the north of Italy, collected data bearing on each of these heads, but we consider it is not desirable that we should publish the whole of the information which we have thus obtained until we are in possession of corresponding facts with regard to other countries, including the United Kingdom. To publish this information alone, without comment, would involve great risk of its not being properly understood, and we are not yet ourselves sufficiently informed to be able in all cases to present trustworthy conclusions as to the value of the institutions which we have seen.

At the same time we think it advisable to make known, without unnecessary delay, certain very recent changes in the French laws on Public Instruction, as well as the purport of others which are still under consideration.

These changes are affecting, and will further affect, the ordinary and higher elementary instruction, both literary and technical, of the workmen and foremen of France, and in order to show their influence upon the former class it will be necessary to give some account of the recent and present position of these branches of instruction in that country. Their effect on the education of foremen will be dealt with in a future report.

It is well known that elementary instruction was, until within the last 15 or 20 years, in a very backward condition in many parts of France, but the information which we obtained from the authorities, confirmed, in so far as some of the larger towns are concerned, by our own observations, and as to the country at large, by statistics, leaves no room for doubt that elementary education has been of late years, and is now, more than ever, an object of great solicitude, and that both its area and its quality have undergone great improvements.

Instruction of conscripts in France.

Comparing the present time with 1867 we find, as to the instruction of the conscripts, that whereas the percentage of those who were unable to read and write was as high as 47·8 in 1833, and had been reduced in 1866–7 to 23 per cent.,* it had fallen in 1880 to 15 per cent.,† and the improvement has been very marked in the principal seats of industry. In the department of the Seine (Paris) there are now only 5·2 per cent. of illiterates, as against 6·7 in 1866. In the Rhone (Lyons) 6·1 per cent., as against nearly 10 per cent. in 1866. In the Gard, including the ironworks and coal mines of Alais, etc., 12·1 per cent., as against nearly 18 per cent. in 1866. In the Marne (Rheims and the woollen district), 7 per cent., as against 18 per cent., and the number of illiterates in the Seine Inférieure (Rouen), which in 1866 was 25·6, though still very large, is reduced to 18·3 per cent.

In 1867 the total number of children on the books of the primary schools was, excluding infants, about 4,500,000.

French elementary schools and training colleges.

In 1879–80, after the loss of Alsace and Lorraine, that number had increased to 4,950,000, out of a total population of 36,900,000, (census of December 1876); the increase being in a great measure due to the State and local bodies taking upon themselves a larger proportion of the cost of primary education. For whereas in 1866–7 the number of children paying no fees was 1,917,000, this number had increased in 1879–80 to 2,879,000.‡

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* Statistics of Primary Instruction from 1829–77, vol. 2.

† Reports of French Inspectors on the state of Primary Instruction for the school year 1879–80.

‡ The figures for the United Kingdom population, 35,246,633, census of 1881, are as follows :—

Children of all ages present at inspectors' visits 1879–80 in elementary schools :—

England and Wales - - - - - -	3,268,147
Scotland - - - - - - -	470,581
Ireland (present at least once during fortnight preceding examination) - - - - -	671,877
Total children - - - -	4,410,605

Government grants for elementary education, training colleges, and inspection 1879–80 :—

	£	£
England and Wales - - - - - -	2,481,168	3,773,963
Scotland - - - - - - -	469,766	
Ireland - - - - - - - -	673,029	
Elementary science and art, United Kingdom -	150,000	
Total State aid to elementary education -	3,773,963	

Local rates for education, 1879–80 :—

	£	
England and Wales - - - - - -	1,562,000	1,775,335
Scotland - - - - - - - -	205,011	
Ireland - - - - - - - -	8,324	
		£5,549,298

Primary instruction is now gratuitous in Paris and in most of the large provincial towns of France as well as in many of the rural communes.

The amount expended in salaries of teachers,† hire of buildings, printing, &c., for public primary instruction was in 1866, 2,160,000*l.*

In 1879–80 it was 3,194,000*l.*, of which—

	In 1866–7	as against	in 1879–80
	£		£
The communes paid - -	874,000	„	1,402,000
The departments paid - -	180,000	„	343,000
The State paid - -	240,000	„	714,000
There was obtained from school fees - -	800,000	„	695,000
The produce of legacies, &c., was - - -	66,000	„	40,000
Total -	£2,160,000	„	£3,194,000

		£
Brought forward - -		5,549,298
Local charges (capital account) for buildings, &c., 1879–80 :—	£	
England and Wales - - - - - -	1,110,000	1,186,801
Scotland - - - - - -	47,780	
Ireland - - - - - - -	29,021	
School fees :—	£	
England and Wales - - - - -	1,432,000	1,775,107
Scotland - - - - - - -	251,807	
Ireland - - - - - - -	91,300	
Subscriptions and other sources :—	£	
England - - - - - - -	940,000	1,014,510
Scotland - - - - - - -	33,994	
Ireland - - - - - - -	40,516	
Approximate total expended on elementary education in the United Kingdom in 1879 - - - - - -		9,525,716
To which must be added subscriptions to training colleges, &c., new buildings of denominational schools, &c. - - - - - -	—	

The Government grants for 1881–82 are as follows :—

	£
England and Wales - - - - -	2,683,958
Scotland - - - - - -	468,435
Ireland - - - - - - -	729,868
Elementary science and art, United Kingdom -	158,000
Total State aid to elementary education -	4,040,261

And local rates, school fees, and subscriptions are also largely increased, but there is as yet no return of them.

† In Paris where the salaries of the elementary teachers are on the highest scale, assistant teachers, that is, all except the head master of a school (*directeur*), begin with 72*l.* and rise by increments of 8*l.* to 88*l.*, besides 16*l.* instead of house rent. A few receive 8*l.* for teaching gymnastics, and 24*l.* for instructing adult classes. After having served for about 10 years they become head masters, whose salaries begin at 104*l.*, rising to 144*l.* If the head masters teach evening classes they are paid 32*l.* for these. They generally live in the school; those residing apart from the school receive an indemnity of 24*l.* for house rent. In the rest of France, except in the principal towns, the salaries are much lower than those above indicated.

The above sums include no portion of the cost of maintenance of those elementary schools, which are not public schools, and which in the year 1866 contained 978,000 children, and in the year 1880 contained 934,000 children; this number of children, however, being included in the numbers previously stated as being under instruction.

Training schools.

Of the 87 departments of France all but six have established training schools for masters. These schools contained in 1879–80, 4,115 pupils. The teaching staff consisted of 358 resident masters and 378 occasional professors. There were also 30 training colleges for mistresses, with 1,076 pupils instructed by 120 mistresses and 101 professors. The current expenses of the training schools in the above year were 156,800*l.*, of which 22,000*l.* were borne by the families of the pupils, 22,100*l.* by the State, and 112,700*l.* by the departments. There are also two higher training colleges in which the teachers for these normal schools are prepared.

Elementary adult schools.

The number of scholars in adult elementary classes which was 830,000 in 1866–7 had fallen in 1878–9 to 580,000, doubtless in consequence of the increased efficiency of the instruction during the school age.* At Le Creusot, for instance, where elementary instruction is universal amongst the children, and where there was formerly a complete system of elementary adult classes these latter no longer exist. The adults in the classes throughout France are now also less illiterate, for whereas in 1866–7, 357,406 of them were reported as absolutely, or nearly untaught, when they joined the classes, the numbers in 1878–9, who on entering were unable to read were only 40,597, and of those who could only read, but not write, there were 43,381.

The course of instruction in the elementary adult classes varies very much; we have been unable to procure any recent authentic statistics for *the whole of* France of the number of pupils receiving instruction in the various subjects taught. Many of the classes are held on Sundays.

Free lectures.

There are, moreover, in Paris, courses of elementary and advanced lectures on every branch of literature, art and science, including modern languages, social science, all the physical sciences pure and applied, biology, mathematics, &c., delivered by men, some of whom have a world-wide reputation as standing in the foremost rank in their respective departments. These courses are gratuitous and attract an auditory composed as largely of working people as of any other part of the population. The courses of the *Collège de France* and of the *Conservatoire des Arts et Métiers* whilst they are a source of interest to visitors from foreign countries are also thronged by working men and women. There are similar courses in all the towns which we visited, and we believe in nearly all towns of any importance in France, nearly all of them are gratuitous. On the other hand there is no systematic laboratory instruction in science for adults, resembling that which we have in this country. We shall revert to this subject in a subsequent report when dealing more generally with the question of adult instruction.

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* The same cause has led to a similar reduction in the number of scholars attending the State-aided night schools in England and Wales, and it was stated by Mr. Mundella in the last session of Parliament that such schools were "annually "on the decrease. Their decline being something like from 70,000 or 80,000 to "40,000 in this year. The teaching of the three R's in the night school has ceased "to be attractive." Hansard, Vol. CCLXIV., p. 1,230.

Adult art classes.

The number of art schools throughout France is very great; nearly all are founded and conducted at the expense of the municipalities. There are more than 100 art classes for adults in Paris alone; all of them numerously attended; most of them well furnished with models and apparatus of every description. The instruction in them is wholly gratuitous, and an enormous majority of the pupils consists of working men. We shall speak of these classes in a future report under the head of art instruction.

French shelter schools (*Salles d'Asile*).

The number of children in the shelter schools (*Salles d'Asile*) in 1866–7 was 432,000, of whom three-fourths were received without payment. In 1879–80 the *Salles d'Asile* contained 606,000 children, of whom five-sixths were received without payment. These institutions can scarcely be styled infant schools in the sense in which we ordinarily use the term. Their aim, besides affording shelter to children too young to attend the primary school, is principally to train the senses according to what is known as the *kindergarten* system. Much importance is attached to the training in these schools by those who are advocating the further development of manual work in the elementary schools.

Primary school buildings.

Under laws enacted on the 1st June 1878 and the 3rd of July 1880 the communes had, from the earlier of those dates until the end of 1880, contracted loans for 2,400,000*l.*, repayable by annual instalments of $\frac{1}{25}$th, extending over 30 years, for the construction, improvement, and furnishing of school buildings. During the same period the State and the departments granted subventions of 1,800,000*l.* for the same purposes, besides large sums paid by the communes out of their annual income.

In 1866 there were 1,707 communes which had no separate school of their own, and each of which joined with some other commune in maintaining a school. This number had been reduced in 1880 to 1,246.

Of communes altogether unprovided with schools there were still 243 in 1880, whereas in 1866 the number of these latter was 650.

State grants for instruction of all grades.

The estimate of the Ministry of Public Instruction for the year 1882 is, in round numbers, 3,430,000*l.*, including 634,000*l.* contributed by the departments; but it is expected that the former sum will have to be increased by from 800,000*l.* to 1,000,000*l.* for primary instruction, as the result of the law on gratuitous instruction of June 16th, 1881, of which we shall speak later.* Of the above total sum, 1,126,000*l.* is the contribution of the State, not including that of the departments, to primary instruction, which will be subject to the augmentation which we have stated. There is no return showing precisely what portion of the 634,000*l.* contributed by the departments is applicable to elementary primary instruction. In addition to the above sums, there is a transfer of 200,000*l.*, formerly charged in the budget of public instruction, which is now charged to the *Caisse des Écoles,* a branch of the *Caisse des Dépôts et Consignations,* which lends money to the communes for school buildings. We give in Appendix No. I., a summary of the estimate of the Ministry of Public Instruction for 1882, which should be read with the above prevision.

The estimate for Fine Arts, which are now under a separate administration, includes a sum of 14,000*l.* for subventions to municipal schools for instruction in drawing. The estimate of the Ministry of Agriculture and Commerce includes—

40,000*l.* for veterinary schools.
80,800*l.* „ agricultural instruction.
74,600*l.* „ technical schools; and
8,600*l.* „ schools of forestry.

There is also an item for the *École Centrale des Arts et Manufactures,* but the receipts of this institution defray all the expenses connected with it.

Besides these sums there are very large amounts, recurring annually, disbursed by the State and the departments, and charged in various ways for the erection and repairs of school buildings for superior and secondary instruction, in addition to the sums which we have noticed above as having been expended on the building of primary schools.

There are also sums charged in the budgets of other ministries for educational purposes, namely, under the Ministry of Public Works, 40,000*l.*, besides an unknown sum included in the item of 161,000*l.* for "New buildings, maintenance, repairs, &c." Under the Ministry of War, 70,000*l.*; under the Ministry of Marine, and of Posts and Telegraphs, votes are also taken for

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* The Civil Service estimates for elementary education, science, and art for 1881-82 are as follows:—

	£
England - - - - - -	3,210,000
Scotland - - - - - -	490,000
Ireland - - - - - -	758,000
	4,458,000
Buildings, Great Britain:—	
Science and Art Department - - -	22,141
Natural History and British Museum, and Edinburgh University Buildings. -	26,500
Ireland:—	
Science and Art - - - - - -	10,000
	£4,516,000

Besides votes in the Army and Navy estimates and in the Indian Home budget.

this purpose, but as they cannot be readily separated from other branches of the service, which have no direct reference to the education of the industrial classes, we have not included them.

Outlay of French municipalities.

It may be useful to state the amounts spent by the representative municipalities of Paris, Lyons, Amiens, and Roubaix, on public instruction.

It should be observed with regard to Lyons that, although one of the most important provincial cities of France, and the centre of its great silk industry, its trade has, owing to various causes, been far from flourishing of late years, but that this fact has not prevented its citizens from voting increasing sums each year for education. Amiens may be taken as fairly representing the provincial towns of medium size, containing some important manufactories, but not being exclusively a manufacturing town. Roubaix is the centre of the trade in worsted fabrics.

Paris.

PARIS.—Population (Census of 1876) 1,988,806.*

The figures for Paris are taken from the estimates for 1882, prepared by the *Préfet*, but not yet adopted by the municipality, which latter for the last two or three years has always voted larger sums than the *Préfet* has demanded.†

PUBLIC INSTRUCTION.

(These figures do not include the office expenses of the central administration, nor the interest on money borrowed.)

Buildings.	£
Superior schools - - - -	3,600
Elementary schools and salles d'asile -	20,000
Repairs of school buildings - -	10,800
Ordinary expenditure on secondary schools - - -	28,000
Maintenance.	£
Scholarships - - -	9,400
Inspectors - - - -	3,000
Salles d'asile - - -	66,100
Ordinary primary schools - -	397,500
Adult classes - - -	15,400
Workshops in primary schools - -	10,000
Drawing in primary schools - -	39,500
Superior elementary instruction -	119,200
Sundry subventions and prizes - -	41,000
Apprenticeship school - -	3,400
Repairs of school buildings for superior and secondary instruction - -	8,000
Repairs of primary, and superior-primary school buildings - - -	16,400
Total - -	£791,300

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* The population of Paris at the census of December 18th 1881 is set down at 2,225,910.

† We are informed that since this budget was presented there has been a large vote for apprenticeship schools not proposed in the estimate of the *Préfet*, vide p. 20.

There is an estimate of receipts, amounting to 83,000*l.*, from the Collège Chaptal and the Écoles Turgot, Colbert, Lavoisier, J. B. Say, and Arrago; but should the law on gratuitous instruction apply to these institutions, as it would appear to do from the text, these receipts must be diminished by a very considerable sum.

Lyons.

LYONS.—Population, 342,815.

Primary and secondary instruction, budget of 1881:—

	£
Buildings (annual vote) - - -	50,000
Salles d'asile and primary school buildings	62,000
Technical or professional instruction -	4,600
Higher instruction - - -	12,000
Municipal drawing schools, and sundries -	3,500
Total - -	£132,000

Amiens.

AMIENS.—Population, 66,896.

Primary and secondary instruction, budget of 1881:—

	£
Buildings - - -	2,700
Secondary schools - - -	2,700
Primary schools - - -	11,800
Salles d'asile - - - -	1,540
Elementary public lectures - -	900
Total - -	£19,640

Roubaix.

ROUBAIX.—Population, 83,697.

Primary and secondary instruction, budget of 1880:—

	£
Buildings, repairs, &c. - - -	11,640
Maintenance - - -	11,260
Total - -	£22,900

and a further sum forming part of a loan of 23,200*l.* contracted for the erection of new school buildings.*

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* These figures may be compared with the sums supplied by school board rates and loans for year ended 29th September 1880 in the following English towns:—

	£
London: Population (1881) 3,814,571.	
School board rate - - -	585,000
Loans for purchase of land, and erection and furnishing of buildings.	409,000
Manchester: Population (1881) 393,676.	
School board rate - - -	18,600
Loans for purchase of land, and erection and furnishing of buildings.	23,100
Bradford: Population (1881) 180,459.	
School board rate - - -	28,000
Loans for purchase of land, and erection and furnishing of buildings.	102,000
Nottingham: Population (1881) 111,631.	
School board rate - - -	12,400
Loans for purchase of land, and erection and furnishing of buildings.	23,300

Elementary school age and classification.

The ordinary elementary school age in France is from the beginning of the 7th to the end of the 12th year, and is divided into three courses, the elementary, the intermediate, and the superior, which last must not be confounded with the instruction in the superior elementary schools (*écoles primaires complementaires*). Each of these three divisions occupies about an equal period of time. In the better schools, some of the courses are divided into two classes, and these classes again into parallel divisions, so that the number of scholars in each may not exceed from 40 to 50.* The whole of the instruction in a class or division, as the case may be, is, except for special subjects, conducted in a separate room. The hours of instruction are from 8 a.m., to 4 p.m., with 1½ hours' interval at noon and one hour from 4 to 5 for gymnastics.

The same master gives all the instruction of a class, except music, gymnastics, and occasionally drawing, in the male, and needlework in the female, schools. Pupil teachers, as assistants, are permitted by law, but their employment appears to be obsolete, as we met with none and could not hear of any being employed in the ordinary elementary schools.

General arrangements and superintendence.

In many of the large cities the children take their dinners in the school. In some cases a kitchen is provided, and the whole or a portion of the cost of preparing the food is borne by the school authority. In the poorer districts of Paris a portion of the cost even of the food itself is defrayed by the municipality, and in extreme cases the authorities provide boots and clothing for the children on the recommendation of the master.

The school buildings, many of which are old monastic and conventual establishments, vary exceedingly as to light, space, and hygienic arrangements.

Corporal punishment in all French schools of every grade is absolutely unknown. The superintendence of the schools of each commune is entrusted to its municipal council, but with certain powers of revision by a departmental school council, who nominate departmental inspectors. These latter, again, are under the supervision of 17 chief inspectors, one for each so-called academy. The departmental council is nominated by the Minister of Public Instruction, through the *Préfet.* The Minister appoints also the chief inspectors.

Under the administration of M. Jules Ferry, conferences of elementary school teachers were organised in every canton, of which there are about 3,000 in France, for discussing the details connected with the instruction and management of the schools, choice of school books, &c.

Elementary curriculum.

The ordinary obligatory curriculum of instruction comprises reading, writing, arithmetic, grammar, geography, the history of France, drawing, and music, and it is strictly carried out in all the large towns.

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* The division into classes is by no means fully carried out in the rural schools. The total number of primary schools in 1879–80 was 77,764, which had only 112,476 classes, or considerably less than two classes per school.

The elements of science are taught as object-lessons in most of the large schools. Some of the schools have cabinets of minerals, botanical specimens, &c., and nearly all possess graphic illustrations of physical and political geography, natural history, raw materials, and manufactured products.*

Manual work in French elementary schools.

Instruction in manual work has of late been introduced into a considerable number of the primary schools of the city of Paris. Manual instruction may consist either in teaching the rudiments of a trade, or an art, simultaneously with the ordinary elementary instruction, as is practised in the school of the Rue Tournefort, or in simply accustoming the children to the use of tools commonly employed in working wood and iron, under proper instructors in the school building, but by preference out of school hours, as is the case in certain of the Paris primary schools.

School of the Rue Tournefort.

The primary communal school of the Rue Tournefort is, so far as we are aware, the only school in France in which rudimentary trade teaching is combined with ordinary elementary instruction. It was established on its present footing in 1873. Until the beginning of last year trade instruction was commenced at the age of ten years and continued for three years. During the first two years every child was taught drawing, modelling, carving, joiner's work, and smith's and fitter's work. In the third year the work was specialised, some of the children being taught modelling and carving, others joiner's work and cabinet making, others again forging and fitting. Since the beginning of last year the same plan has been continued, but, in addition, the children in the lowest classes, beginning even at six years of age, have three lessons of one hour each per week of the instruction in handicrafts which, until then, did not begin until they had attained the age of 10 years.

Although, as has been said, the work is specialised in the last year the pupils engaged in modelling and carving return one day in each week of that year to the joiner's bench and the forge, the joiners and turners return to the forge and modelling, and the smiths to modelling and joiner's work. The school hours are from eight in the morning till six at night with a half-holiday on Thursdays, and the scholars are allowed to come on Sundays from 9 o'clock till noon, and from 1 till 4 for recreation and to take part in amusing lectures. In the highest class they have 18 hours work per week in the "shops" besides instruction in drawing, geometry, and natural science. We give the time table in Appendix II. There are 360 children in the school. The children on leaving this school are generally able to earn from 2*s.* 6*d.* to 4*s.* per week.

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* The best of these illustrations are published by Deyrolle of the Rue de la Monnaie, and are supplied gratuitously to the poorer communal schools by the Minister of Public Instruction.

Manual work in Paris primary schools.

The reports of the inspectors not being very satisfactory as to the literary instruction in the school of the Rue Tournefort, the authorities of the City of Paris, in their further experiments in the introduction of manual instruction into the ordinary primary schools, have confined themselves to the teaching of more advanced drawing from models,* and the use of the ordinary tools employed in working wood and iron, without attempting to teach special trades. The manual instruction in these schools begins only at the age of 10 years ; it is for the present optional, and is given before and after the usual school hours. There were when we visited Paris, 23 primary schools to which workshops had been attached, 10 others were on the point of being opened, and preparations were being made for attaching workshops to 12 others.† The rooms for instruction in drawing and the workshops in these schools are well ventilated and lighted. Special inspectors of manual work have been appointed who determine the quantity of work to be done, and judge of its quality.

We found that the municipalities of several towns which we visited were giving a favourable consideration to the introduction of manual labour into their ordinary elementary schools, after the example of Paris, and we were informed that both at Rennes and Marseilles arrangements have been made for teaching manual work in the primary schools.

French superior elementary schools.

Besides the ordinary elementary schools there are, in most of the large towns, superior elementary schools (*écoles primaires complementaires*) for literary and in some cases technical instruction. The cost of instruction in these schools, when it is not free to all, is very cheap, from 7 francs to 10 francs per month, and even these low fees are, in the case of the non-gratuitous schools, either partially or wholly remitted to many pupils by means of scholarships (*bourses*) granted by the State, the departments, and the communes. The entrance is obtained by a non-competitive qualifying examination, or on presentation of the *certificat d'études primaires* to which we allude later.‡ Some of these shools provide workshop instruction adapted to the wants of the industries of the districts in which they are situated. We have not been able to obtain recent statistics of these schools but they are increasing very rapidly in number though they are still confined to the larger towns.

It was proposed recently to establish a superior primary school with workshop instruction in every canton, but it was thought that this political division would not correspond in practice with the industrial requirements, which should give the distinguishing character to each of these schools. We visited some of the principal types of them in Paris, Rheims, Lyons, Rouen, Lille, Douai, Nismes, St. Etienne, Roubaix, and Amiens: some of these schools include instruction in weaving and dyeing and other manufacturing processes. The advanced age of the scholars in these schools places their advantages beyond the reach of those children whose parents are obliged to send them to work at the age of 13, and consequently they do not educate the ordinary workmen, but are available for the instruction of those destined to hold higher positions, whether industrial or commercial. This is true even in cases like that of the superior elementary school of Le Creusot, founded in strict relation to those great works. The children on leaving that school either become clerks or enter a higher technical school, generally the *École des Arts et Métiers* at Aix, in order to be trained as foremen or managers.

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* In all the ordinary primary schools of Paris drawing is taught from geometrical models and from casts, rather than from flat examples or copies.

† These types of school must not be confounded with the apprenticeship school, properly so-called, the aim of which is to form journeymen in various trades, whilst giving them a somewhat more advanced literary and scientific instruction.

‡ For description of this certificate *see* also Appendix, No. III.

We only mention the superior elementary schools generally at this stage of our enquiry because they will be affected by the law on gratuitous instruction. It will be our duty to describe them in a subsequent report when we shall be able to compare them with the schools of a similar character in other countries.

French apprenticeship schools.

There is, however, a peculiar type of superior elementary combined with technical instruction, namely that of the apprenticeship schools, of which we deem it desirable to give some description in this report, on account of the special attention which is at present being given to them in France. The object of these schools is to form workmen as distinguished from foremen.

As yet such schools are few in number; two distinct types of them have been repeatedly described. We allude on the one hand to the apprenticeship school in the large printing establishment of Messrs. Chaix and Cie. and on the other to the École St. Nicolas in the Rue de Vaugirard, conducted by a charitable association under the superintendence of the Christian Brothers. The schools of this association, including the branches at Issy and Igny, contain upwards of 2,400 pupils. The school in the Rue de Vaugirard alone has 720 ordinary scholars and 250 apprentices, all of whom are boarders. They pay an entrance fee of 2*l.*, and 16*l.* 16*s.* per annum for their board and instruction. The pupils of the ordinary schools are not received until they have a tolerable knowledge of reading, writing, and the first three rules of arithmetic. The course of studies for this section of the school includes moral and religious instruction, reading, writing, the elements of history, of geography, and of the French language and literature, arithmetic, the elements of algebra and geometry, surveying, linear and ornamental drawing, modelling, book-keeping, the elements of physics and chemistry, vocal and instrumental music, English, German, and gymnastics.

The average age at which the apprentices usually enter the workshop is 14. Their parents contract with masters or foremen of good character, selected by the Christian Brothers to teach them their trades. The work is done in the school at the risk and for the benefit of their masters, and without profit to the school; the boys receive no payment of any kind. The apprenticeship is for three or four years, according to the nature of the trade. After its expiration the apprentices may remain as journeymen in the workshops of the establishment for one year longer, their board being paid for by the masters for whom they work. There is a house, patronised by the establishment, in the Rue de Turenne in which the workmen, after they have left the Rue de Vaugirard. are lodged and boarded on very reasonable terms. This house contains club rooms, a library, and free classes in drawing, book-keeping, foreign languages, &c.

The apprentice boys receive instruction from the Christian Brothers for two hours daily, which comprises not only the ordinary school lessons, but also teaching in drawing, modelling, and other appropriate subjects. The following trades are taught: Bookbinding, optical and mathematical instrument making, type setting, printing, working and chasing in bronze, brass instrument making, gilding, joiners' work, saddle making, wood carving, wood engraving, map engraving, and engine fitting. The apprentices appear to be well taught, and find employment readily after they have left the workshops at wages, it is said, varying from five to even as much as eight francs per day.

Municipal apprenticeship schools.

School of the Boulevard de la Villette.

Several of the municipalities of France have considered the subject of apprenticeship one of sufficient interest to induce them to establish public apprenticeship schools, one of which, the municipal school of the Boulevard de la Villette in Paris for workers in wood and iron, has been in operation since the 8th Dec. 1872. Unlike the École St. Nicolas, it is a day school. The boys are admitted, after they have left the ordinary primary school, on presenting the certificate of primary studies, or on passing an equivalent examination. The instruction is gratuitous, and is divided into general and technical; the general instruction, besides continuing those subjects which are obligatory in primary schools, includes some which are optional in those schools, such as the elements of mathematics, physics, mechanics, and chemistry, in their relation to industry. As will be seen from the report of M. Corbon on this school (see appendix No. IV.) the error was at first committed of making this latter instruction too advanced, with the result of fatiguing the scholars and rendering them inattentive. We believe this mistake has now been corrected.

The theoretical instruction also includes explanations concerning the tools, the materials, the processes, and the products presented by the range of practice of the workshops. During the summer, visits are paid to industrial establishments, of which the scholars give an account in writing.

The trade instruction in the workshops is sub-divided into two courses. In the first the pupils are taught the nature and conversion of materials. In the second they pass on to actual construction. The first or preparatory course is the same for all the pupils. They all go in rotation through the workshops for both wood and iron. One of the reporters on the school says that "this is done in order to give suppleness and certainty to "the hand, and to enable them, when they have become work-"men, to take up in case of need, at any rate for a time, a trade "different from their ordinary one, and thus to gain a living in "bad times." The choice of a trade takes place only at the commencement of the second course which coincides with that of the second year, and it is only then that they begin to execute actual constructive work. No apprentice is allowed to commence any work whether complete in itself, or a part of a machine, without having previously made a sketch, or a drawing of it to scale, so that the pupil must necessarily acquaint himself with its proportions and connections, and understand fully the nature of what he is doing.

The entire course occupies three years. The boys enter the school at 7 a.m. and leave at 7 p.m. During the first two years six hours daily are spent in the workshop and four in the school. In the third year eight hours are spent in the workshop and two in the school, leaving in each case two hours for meals and recreation, the latter including three hours of gymnastic exercises per week.

The following is the time table :—

TIME TABLE of the PARIS MUNICIPAL APPRENTICESHIP SCHOOL.

Day.	Years.	7 to 8.	8 to 9.	9 to 10.	10 to 11.	11 to 12.	Observations.
Monday	1	Preparation of lessons.	French	Sketches	Preparation of lessons.	English	For all the three years { 12 to 1 lunch and recreation. 1 to 3½ workshops. 3½ to 4 meal and recreation. 4 to 7 workshops. } From 10 minutes to 10 until 5 minutes past 10 there is a quarter of an hour's recreation for all the boys.
	2	"	Mathematics	Preparation of lessons.	English	Physics	
	3	"	Mechanics	Chemistry	Workshops		
Tuesday	1	"	Technology	Preparation of lessons.	Sketches	Geography	
	2	"	History	French	Preparation of lessons.	Mathematics	
	3	"	Sketches and Drawing		Workshops		
Wednesday	1	"	History	French	Preparation of lessons.	Mathematics	
	2	"	French	Preparation of lessons.	Sketches and Drawing		
	3	"	Technology	Mathematics	Workshops		
Thursday	1	"	Physics	French	Preparation of lessons.	English	
	2	"	Geography	Preparation of lessons.	English	Chemistry	
	3	"	Sketches and Drawing		Workshops		
Friday	1	"	Chemistry	Drawing	Preparation of lessons.	Mathematics	
	2	"	Technology	Preparation of lessons.	Sketches and Drawing.		
	3	"	Preparation of lessons.	Mathematics	Workshops		
Saturday	1	"	Preparation of lessons.	Mathematics	Preparation of lessons.	Descriptive Geometry.	
	2	"	Mechanics	Preparation of lessons.	Descriptive Geometry.	Mathematics	
	3	"	Physics	Common law	Workshops		

The school is under the superintendence of a council, composed of one of the chief school inspectors of the City of Paris, of the director of the school, and the superintendent of the workshops.

The general conduct of the scholars is reported to be good. It has, however, been necessary to exclude some boys for insubordination. The rewards, besides those common to French schools, consist of a fortnightly premium, varying from 25 centimes to 3 francs, and prizes of books, tools, and articles manufactured in the school. The attendance is fairly regular, the average number of absentees not exceeding 7 per cent., including the absences caused by illness. The irregularity is confined mainly to the pupils of the first year. The boys become more assiduous as they become accustomed to their work. When we visited the school unannounced we found the lads working steadily and looking strong and healthy. M. Gréard, in his report of 1878, states that during the five preceding years not one of the boys had died.

The number attending the school has been constantly increasing. In January 1873 it had only 17 scholars. On May 1st, in the same year, the number was 64; last year it was 250, of whom 107 were of the first year, 81 of the second, and 62 of the third year.

A considerable proportion of the boys leave the school during or at the end of the first year, generally because their parents find that they are not fit for the work. A smaller number leave at the end of the second year, because their parents are unable or unwilling to forego their earnings for a longer time. These latter boys, on leaving the school, often receive fair wages in second-rate workshops. It appears from a table, furnished to us by M. Bocquet, the superintendent of the workshops, that the boys who were in the school last year in their second and third years were distributed among the trades as follows:—

	2nd year.	3rd year.
Fitters - - -	42	34
Smiths - - -	5	2
Turners in metal - -	3	5
Carpenters and joiners -	4	2
Pattern makers - -	11	5
Wood turners - -	0	0
Locksmiths - - -	11	4
Electrical apparatus makers -	5	10
Total - -	81	62

This table, as well as the general experience of the school, shows that the greater number of the boys become engine fitters or pattern makers, the two trades which in Paris command the highest wages.

The work of the electrical instrument makers, shown to us was remarkable for excellence of quality, but some of the school authorities do not appear to attach much value to this branch of work.

The boys on leaving the school, with very few exceptions, earn wages varying from 2*s.* 6*d.* to 5*s.* 6*d.* per day.

The buildings which were originally erected for the purposes of a manufactory have been considerably enlarged since their acquisition by the City of Paris, and, like many of the elementary schools, labour under the defect that they were not specially designed for the use to which they are now applied. The total sum which has been expended on them is 49,000*l.* The annual cost of the maintenance of the school is under 3,000*l.* or somewhat less than 12*l.* for each pupil. We give in Appendix No. VIII. some letters with which we have been favoured, in which opinions are expressed concerning the work of the pupils educated in this school.

Projected apprenticeship schools for Paris.

The authorities of the City of Paris have deemed the experiment of apprenticeship teaching in the school of La Villette sufficiently successful to induce them to decide upon the erection of a number of other similar schools in various parts of the metropolis.* The whole subject was referred to a commission, and its president, M. Tolain, in a report to the Prefet of the Seine, which will be found at length in Appendix No. V., says, "that, in " consequence of the virtual abolition of apprenticeship in most " trades, and owing to the specialisation and sub-division of " manufactures resulting from the introduction of machinery, the " number of skilful and intelligent workmen in all branches " of industry and art manufacture has decreased, and that the " standard of technical knowledge has been lowered."

This, he considers, has been especially prejudicial to French manufactures, the distinguishing merit of which he believes to have consisted in originality of design. The vulgarisation of manufactures has, in his opinion, given great facilities for piracy, especially on the part of foreigners. He believes that a remedy for these evils will be found in the establishment of apprenticeship schools, the object of which should be mainly, not the creation of foremen, but the theoretical and practical education of workmen proper. In determining what should be the trades taught in schools founded and carried on at the cost of the municipality, he calls attention to the fact that apprenticeship still exists in those branches of industry which are concerned with the making up of materials into clothing, and he proposes, therefore, that these arts should not be taught in the municipal schools. He would confine them to what he calls "parent industries"; that is to say, those in which the processes to be taught are applicable to a large number of allied trades. He recommends, accordingly, that for the present three apprenticeship schools should be established, one in the Faubourg St. Antoine for the furniture trades, to form workers in wood, who would become chiefly cabinet makers and upholsterers, but also carpenters, joiners, and wood carvers; and workers in iron intending to become general smiths and workers in metal for the same trades and for decorative purposes. The second school should be for the south of Paris, on the model of that of La Villette, intended however to train not only mechanics, but also iron-founders, carpenters, stone cutters, and masons, iron and tin-plate workers, slaters and plumbers, so as to be a complete school of apprenticeship for the building trades. A third school in the heart of Paris should comprise the following trades, viz., instruments of precision, telegraphic apparatus, clock-making, surgical instrument-making, and small machinery in general. In addition to these three schools for boys he recommends that a school should be established for girls, which should be not only an apprenticeship school, but also one of domestic economy; the latter division would include general house-work, laundry work, sewing, and, in addition, the obligatory parts of primary instruction, together with linear drawing, gymnastics, singing, and some special notions of technology having reference to the duties of housekeeping, and to the materials to be used in the workshops. The trades to be taught would be millinery, embroidering, lace-making, dressmaking, artificial flower and feather making, and with these latter there would be compulsory courses of drawing from flowers and nature, and of modelling.*

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* We are informed that they have within the last few days voted 80,000*l.* for the erection of these schools.

Proposed girls' apprenticeship school.

The estimate for the girls' school, intended to receive 300 outdoor pupils, is for buildings alone, exclusive of the ground, 21,600*l.*, and for fittings, 1,600*l.*

The instruction in all of these schools will be gratuitous, and the pupils, in order to be admitted, will have to present the *certificat d'études* of the primary school.

Havre apprenticeship school.

A few provincial municipalities have established apprenticeship schools of the same type as that of the Boulevard de la Villette, that is to say, schools to form workmen and not foremen. There is one at Havre, which has undergone various transformations, and is now one of the most complete of its kind in regard to buildings and fittings. The course, like that of the Villette school, occupies three years. The time spent in the workshops is six hours daily throughout the whole course. The book work begins at a much more elementary stage than in the Paris school, and appears not to be carried so far; no *certificat d'études* is required on entrance. Even absolutely illiterate children have been admitted, if they have shown some manual dexterity. The admission or rejection of applicants is in fact left to the discretion of the head master. With the object of inducing the apprentices to remain at school during the third year, the pecuniary rewards are much higher than in the Paris school. A boy here may receive as much as 6*l.* in his third year. Notwithstanding this, the number of boys who completed their third year diminished steadily from 1876–77 to 1878–79; it was 26 in the former, and only 17 in the latter year; 16 of these entered private workshops, and one went to sea as an engineer. The cost of maintaining the school, exclusive of materials used in the workshops, was, in 1880, 1,120*l.* for 160 boys, a small portion of which was recovered by payments for work done by the boys.*

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* A girls' school, corresponding in some particulars to the above, and maintained by the Municipality of Rouen, the *école professionelle des jeunes filles,* was visited by the Commissioners. There are in Paris establishments conducted by nuns, containing a large number of children, who work at artificial flower making, millinery, and other trades, but these cannot be considered as apprenticeship schools.

Guild apprenticeship schools.

We were told that several of the Paris *syndicats* (guilds) of employers had established apprenticeship schools, but we found on inquiry that nearly all of these were simply drawing schools for evening instruction. The jewellers have founded prizes of considerable value for original goldsmiths' work, to be competed for by their apprentices. The only apprenticeship school proper, founded by a guild that we met with, was that of the clockmakers in the Faubourg du Temple. The trade of clock-making is carried on in Paris in the houses of the workpeople, to whom the parts are given out in the rough, and the masters have therefore no control over the instruction or training of the apprentices. Under these circumstances they established the school in February 1881. It contains 25 pupils, the course lasting four years. The present premises are only provisional and are about to be extended. The expenses are mainly borne by the *Chambre Syndicale de l'Horlogerie,* which contributes 560*l.* The Government has granted the school a subvention of 80*l.* and the city of Paris 40*l.* The pupils pay 12*l.* per annum, and provide the small tools needed in their work. The larger tools (machinery) are furnished by the school authorities. The pupils receive complete instruction in watch and clock-making; and the teaching is both theoretical and practical. The practical course for the first class† is, the use of tools and roughing-out work. For the second class, finishing; for the third class, escapements, and for the fourth, regulating and repairs. The course of theoretical instruction for the first three years includes French, the elements of mathematics, geometry, and machine construction applied to watch and clock making, the theory of the construction of watches, book-keeping, and linear drawing. In the fourth year they are taught algebra, trigonometry, the elements of physics and chemistry, cosmography, and industrial drawing. Examinations take place at the end of each school year. Students are admitted at 14 years of age, but not earlier, except in special cases. The working hours, during the winter months (from October to April), are from 8 a.m. to 7 p.m., with an interval of one and a half hours, from 12 to 1.30 for meals and relaxation.

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* Since this report was written, we learn that the municipal authorities of Boulogne-sur-Mer are establishing an apprenticeship school on the model of that of La Villette, which it is expected will be opened before the end of the present year.

† Each class represents a year's work.

During the remainder of the year the hours are from 7 a.m. to 7 p.m., with the same interval as before. Arrangements have been made for boarding the pupils, at a fixed inclusive charge of 32*l.* per annum. Even when machinery shall to a great extent have superseded manual labour in the wholesale manufacture of watches and clocks, a number of skilled operatives will always be required in this trade, so that the school will not cease to be useful.

Government apprenticeship schools.

The Government has founded, and sustains, certain apprenticeship schools for manufactures; one of them is the watchmaking school at Cluses, under the Ministry of Agriculture and Commerce. It is taking the place of a municipal school for the same trade at Besançon, which has been frequently reported on, but which we were told by a competent authority is now declining. Another is the school of porcelain decoration at the manufactory of Sèvres founded within the last two years by the director, M. Lauth, of which, as well as of the recently remodelled school of a similar character at Limoges, we shall speak when we come to deal with art schools. There is also an apprenticeship school attached to the *manufacture des Gobelins.*

Grounds for legislation in France.

From the preceding statements it will be observed how great is the activity displayed in France in all that relates to the instruction of artizans. But those who are engaged in this great work are also fully alive to its deficiences. The reports of the Government primary school inspectors abound in complaints of imperfect methods of instruction and of irregular attendance. The proportion of uncertificated teachers in the *écoles libres* (that is those schools not owned by the Communes, including private schools) and especially amongst the female teachers in the schools taught by the religious orders, both public and "libres," is very large; and as a consequence the instruction is reported as being very inferior in many of these schools.

The ultimate results of the teaching in the ordinary elementary schools, as shown by the examinations on leaving, are not satisfactory. Children who have completed their twelfth year are admitted to an examination, without passing which they are not allowed to work full time (12 hours) in workshops and factories before the age of 15. We give the full regulations of this examination in Appendix No. III. It will probably not be considered more difficult than that of the children in our English schools, who pass the fifth standard, and have taken up one or more of the special subjects. The entire number of children out of the 4,900,000 on the books in 1879–80, who presented themselves for examination for this certificate was 85,825 of whom only 57,336 passed. The examination for this certificate was, until lately, a dead letter in many departments which may partly account for the smallness of the number who presented themselves.[*]

The educational provisions of the factory law of May 19th, 1874, the full text of which is given in Appendix No. VI., appear not to be well observed in many localities. By its 8th article this law directs that children up to 12 years of age shall attend a school, and in Article 9 it provides that young persons, up to the age of 15 years (completed), shall only work six hours a day, unless they produce a certificate of primary instruction. The 15 regional inspectors are quite unable to ensure the observance of these regulations, unless assisted by the special inspectors, or by the local committees for which the law provides. These committees and inspectors, whilst very active in Paris, are either wanting or inefficient in many of the departments.[†]

These defects in the state of ordinary elementary instruction; the desire to extend the introduction of manual work into ordinary elementary schools, and to encourage higher elementary and trade instruction, combined with political and social considerations into which it is no part of our duty to enter here, have led to the enactment of the law of December 11th 1880 on handicraft apprenticeship schools, and of the law of June 11th 1881 on gratuitous primary instruction, and to the introduction of the "*projet de loi*" on compulsory primary instruction, which is still before the chambers.

French law on superior elementary instruction.

The law of the 11th December 1880 provides that apprenticeship schools, founded by the communes and the departments to develop in young persons intending to become artisans the necessary dexterity and technical knowledge; and public superior elementary schools (*d'enseignement primaire complémentaire*), the curriculum of which includes courses or classes of professional instruction, are to be ranked in future as public primary schools.

Schools of the same character as the preceding, but which are not public schools are included amongst those which may receive assistance from the budget of public instruction, after they have been established and working satisfactorily for two years. Schools of both of these categories may also receive assistance out of the funds of the Ministry of Agriculture and Commerce as being technical schools.

The programmes of their founders (communes, departments, or otherwise) must be approved by the Ministers of Public Instruction and of Agriculture and Commerce.

The head master is appointed on the recommendation of the municipal council of the commune, or of the general council of the department, as the case may be. The teachers of trades are appointed by the *Maire*, or the *Préfet*, as the case may be, on the recommendation of the council of supervision attached to the school; the council itself is nominated by the municipal council, or by the general council of the department.

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[*] No *certificats d'études* were delivered in 1879-80, in the Loire Inférieure, where so many of the children and young persons are employed in factories; the cause being stated to be, a refusal on the part of the general council of the department to allow the examination to be held.

[†] Note *see* Report of M. Dumas, 6th May 1878, quoted in M. Gréard's Report of 1st November 1878.

Vierzon school under the above law.

By a decree of the 9th July 1881 a national school of superior primary and technical (professional) instruction, preparatory to apprenticeship, destined to serve as a type for similar schools, to be founded under the law of December 11th 1880, is created at Vierzon.

A report dated 11th August 1881 by M. Tolain, president of a commission appointed by the Minister of Public Instruction, although the commission was simply requested to prepare the programme of a school for superior primary and professional instruction, recommends (see report in Appendix No. VII.) that the establishment in question shall comprise a series of graded schools, consisting of a *salle d'asile* and *kindergarten*; an ordinary primary school, in which manual work is to be taught; and a superior primary school of a somewhat advanced character, including technical instruction, and extending over a three years' course. The entire range of instruction is intended to be introductory to schools which the report designates as special apprenticeship schools of the second degree, that is, schools like the *Écoles des Arts et Métiers* for training foremen and managers, of which we shall speak in a subsequent report.

French law on gratuitous primary instruction.

The provisions of the law on gratuitous primary instruction, passed on the 16th June 1881, are as follows:—

From the day when this law came into force (1st January of this year) no school fees are payable in public primary schools or public *salles d'asile*, and no charge is to be made for boarding or instruction in the training schools (*écoles normales*).

A sum equal to 4 per cent. of the four so-called "*quatres contributions directes*," viz.: The tax on real property; window-tax (*portes et fenêtres*); tax on moveable property (*contribution mobilière*); and license fees (*patentes*); must be provided by every commune for the service of primary instruction, either by a special vote, or out of its general funds.

Besides the sum before-mentioned, every commune (except the poorest) must devote to the service of its primary schools, before it is entitled to aid from the department, or the State, one-fifth of the income derived from the following local sources of revenue:—

1. The income from its real property.
2. Its share in the duty on horses, carriages, and game licenses.
3. The dog tax.
4. The net income from the *octroi*.
5. The income from highways, and from markets and fairs.

If these resources are insufficient, a like sum equal to 4 per cent. of the four direct taxes must similarly be raised by the departments.*

If the total amounts thus raised are insufficient for the service of the schools, the State will provide the deficiency.

The salaries and allowances of the teachers at present employed, are in no case to be less hereafter than the highest amount which they have received during the three years preceding the date when the new law came into operation, and these salaries are in future to be determined each year by the Minister, on the proposal of the *Préfet*, and by the advice of the departmental council. It must be understood that the financial portion of the law applies to the maintenance and not to the construction of schools, and that the latter will be provided for as before, by loans from the *Caisse des Écoles*, aided, in the case of poor communes, by the department and the State.

The optional tax, in addition to those mentioned above, which the communes were authorised to impose upon themselves under a law of the 10th April 1867, if they chose to adopt gratuitous education, ceases, and the charges which the communes and departments have to bear, are strictly limited. There will no longer, therefore, be the same temptation as formerly on the part of the poorer communes to keep down the expenses of the schools.

Operation of the two laws.

By the joint operation of these two laws, school fees are abolished not only in the ordinary public elementary schools, but in all public superior elementary schools in which technical instruction is given, or in which trades are taught.

It is expected that the communes will, under these new circumstances, avail themselves to the fullest extent of their powers to borrow from the *Caisse des Écoles;* that ordinary primary schools will be built in those communes where they do not as yet exist; that instruction in the existing schools will be largely extended and improved, and that a great impulse will be given to the creation of superior elementary and technical schools under the new definition, now given, of an *école primaire.*

French projected law on compulsory primary instruction.

But the extent of this impulse in the immediate future to elementary instruction in France, as now defined, can only be properly estimated, after taking into account further the certainty admitted by persons of all shades of opinion in that country, that attendance at school, or efficient instruction at home, will be made compulsory at a very early date. A *projet de loi* on compulsory instruction, introduced by the Government, was adopted by the Chamber of Deputies on the 24th December 1880. It was modified by the Senate as regards some of its minor provisions, and returned to the Chamber, which latter, accepting some of the changes made by the Senate, and rejecting others, passed it again on the 25th July 1881. Both Chambers are agreed:—

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* In practice this sum of 4 per cent. is now required and voted in all the departments, and will continue to be so.

That primary education shall include—
  Moral and "civic" instruction, reading and writing.
  The French language and the elements of its literature.
  Geography—especially that of France.
  History—especially the modern history of France.
  The elements of law and political economy.
  The elements of the physical and mathematical sciences, and their application to agriculture, to health, and to the industrial arts.
  Manual work, and the use of the tools of the principal trades.
  The elements of drawing, and modelling; music and gymnastics.
  And for boys, military exercises.
    For girls, needle-work.

That religious instruction shall not be given on week days in public schools, and that it shall be optional in private schools.

That the power of ordering religious inspection, vested in the Ministry of Public Worship, shall be abolished.

That primary instruction shall be compulsory for children of both sexes, including the blind, and deaf-mutes, from the beginning of the seventh to the end of the thirteenth year.

That there shall be a school board in every commune,* composed of the *Maire*, of certain persons to be named by the inspector of the *académie*,† of the inspector of primary schools of the department, and of a number, not exceeding one-third of the whole board, of persons named by the council of the commune. (There are special provisions as to the composition of this board, in the case of Paris and Lyons).

That children may present themselves for examination for a "*certificat d'études*" at the age of 11, and, on passing it, are to be exempted from further compulsory primary instruction.

That all children whose parents do not give notice that they are receiving instruction at home, or at a public or private school, which they must name, are to be entered by the *Maire* on the books of some public school.

That proper attendance-books shall be kept by all schools, and absences reported by the head masters.

That private schoolmasters not attending to this regulation may be reprimanded or suspended by the departmental council.

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* There are about 36,000 communes in France.

† France is divided, for the purposes of public instruction, into seventeen *académies*.

That in case of irregular attendance the persons responsible for the children shall be liable to be reprimanded, and, upon the repetition of the irregularity, to have their names posted on the door of the *mairie*. If the offence is again repeated the primary inspector shall summon the parent or guardian before the *juge de paix*, and he shall be liable to the punishments imposed on police offences by 479, 480, and the following articles of the *code civil;* article 463 is also applicable to them. Irregularity of attendance is defined as consisting of four absences in a month from one or both of the daily attendances.

That the school board may, subject to the consent of the departmental council, exempt children employed in trades or in agriculture, from one of the two daily attendances.*

That all children educated at home are to be examined annually by a committee selected by the Inspector of the *académie*, and if the examination is not satisfactory the child must be sent to a public or private school to be designated by the parent.

The points remaining in dispute between the two Chambers are—

1. Whether or not the schoolmasters are to teach the children natural religion.
2. Whether the departmental council may or may not authorise religious instruction to be given by the ministers of the various denominations in the school buildings on Sundays and holydays, and after school hours, if the parents shall have required it.
3. Whether the parents of children educated at home shall or shall not name a member of the examination committee.
4. Whether the first examination of children educated at home shall be at the age of 10 or of 8.

The Senate proposes the first alternative in each of these four cases.

Conclusions.

We think it will be evident from the account which we have given of the new laws enacted and proposed, that their influence on the diffusion of ordinary and superior primary instruction, both literary and technical can scarcely be over-rated. It is clearly the aim of the Government, and of the great cities that this superior instruction shall be placed as fully as possible within the reach of the working men. The instruction in the use of tools during the elementary school age, besides being of service to every child, whether destined to become a mechanic or not, will tend, in the former case, to facilitate the learning of a trade, though it may not actually shorten the necessary period of apprenticeship. We should be glad to see this kind of manual instruction introduced into some of our own elementary schools. The consideration of the expediency of a grant from the Education Department for instruction of this kind may well be deferred for the present. Of the benefit to be derived from more diffused and advanced literary instruction we need not speak.

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* Hence, on the passing of this law, children can only be employed as half-timers in trades and agriculture, under the age of 13, by the joint consent of the commune and of the department, unless, at or above the age of 11, they have obtained the "*certificat d'études*."

We have greater difficulty in estimating the necessity for, and the value of, apprenticeship schools, as a mode of training artizans. Whilst giving due weight to some portions of the reasoning of the French reporters, we feel sure that they underrate what, in spite of the partial cessation of apprenticeship, can be, and is, learnt in the ordinary workshop. We are not sufficiently convinced of the advantages of apprenticeship schools for training ordinary workmen, like those of La Villette and Havre, as compared with the great cost of their establishment and maintenance, to warrant us in recommending their introduction into this country, until they have had a more prolonged trial abroad.

It will be manifest from the description we have given of the ordinary elementary and apprenticeship schools in France, that, with the exception of the very recent introduction of manual work into the schools of Paris, and of the instruction in trades, provided, in a few cases, for a small number out of hundreds of thousands of apprentices, French workmen generally, as distinguished from those employed as foremen, or aspiring to that position, have not until now, except as to systematic teaching in drawing, possessed, during the school age, better instruction than persons of a similar condition in this country. Of the training more especially adapted to foremen we shall speak in a later report.

The question is more complex as regards adult instruction. So far as this is simply elementary, it is, thanks to the improved primary education of children, daily becoming less needed, and therefore of less importance, both in this country and in France. As to the more general instruction of adults in literature and science, it must be admitted that the gratuitous courses of lectures, given in all the large towns of France are very valuable. The comparison of this class of instruction with that of a similar character in our own country will be considered in a subsequent report.

With respect to art teaching, owing to the early training of the children in this subject, the excellent quality of the instruction in the adult schools, and its gratuitous character, placing it within the reach of the very poorest, the proportion of *bonâ fide* working men receiving practical instruction in France is greater beyond comparison than it is with us. On this branch of the subject also we shall speak in detail in a further report.

We wish it to be distinctly understood that if we have not in this report made any recommendations for the improvement of the instruction of our own artizans, beyond that of the introduction of manual work in some of our ordinary elementary schools, it is not because we are not fully alive to the need of greatly improving their general and technical training, but because we are at present only at the outset of our mission. For the same reason, the instruction of foremen, superior managers and proprietors of industrial establishments, has been entirely excluded from our present report, and we should have refrained from making any report whatever at so early a stage of our inquiry had we not thought it advisable to show, how great has been for some time past, and how much more strenuous than ever is now, the endeavour on the part of the French nation to supply the defects of their system of elementary education, and whilst rendering it more efficient, to extend it to the whole of the working population, as well as to place within their reach increased opportunities for technical instruction, the former being, it is hardly necessary for us to say, the only sound foundation for any subsequent technical training.

We avail ourselves of this opportunity to render our thanks to the public authorities, to the owners and managers of industrial works, and to the numerous other persons abroad to whom we had occasion to apply for information, for the frank and courteous manner in which it was given to us; and also to acknowledge the prompt and valuable assistance which we received from the members of our Diplomatic and Consular services in the prosecution of our inquiry.

All of which we humbly beg leave to submit for Your Majesty's gracious consideration.

(Signed) B. SAMUELSON.
H. E. ROSCOE.
PHILIP MAGNUS.
JOHN SLAGG.
SWIRE SMITH.
WM. WOODALL.

Gilbert R. Redgrave,
Secretary.
17th February 1882.

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APPENDIX No. I.

MINISTRY OF PUBLIC INSTRUCTION AND FINE ARTS.

SUMMARY of FRENCH ESTIMATES for PUBLIC INSTRUCTION for 1882.

Ordinary Budget.

		£
1.	Salary of the minister and cost of central administrative staff	29,164
2.	Heating, lighting, liveries, printing, &c., for central administration	5,556
3.	Superior council and general inspectors of public instruction	18,548
4.	General expenditure for administration of public instruction	23,760
5.	Academic expenditure	61,082
6.	Superior normal school	18,936
7.	Faculties at the universities	429,916
8.	School of advanced studies (hautes études)	12,000
9.	Recompenses to the members of the teaching staff and outlay on classic works	2,000
10.	National Institute of France	28,310
11.	Academy of medicine	3,020
12.	College of France	19,883
13.	Museum of natural history	35,433
14.	Astronomical and meteorological observatories	36,036
15.	Instruction in modern Oriental languages	6,224
16.	School of charts	2,852
17.	French schools at Athens and Rome	5,569
18.	National library, ordinary expenditure	27,762
19.	,, ,, extraordinary expenditure	2,000
20.	Public library and Algerian museum	12,266
21.	National archives	8,188
22.	Learned societies and international exchanges	6,640
23.	Journal of savants	960
24.	Scientific and literary subscriptions	5,600
25.	Encouragement and assistance to literary and learned men	8,000
26.	Travels and scientific missions. Museum of ethnology	8,884
27.	Collection and publication of unedited documents relating to the history of France	6,600
28.	General cost of secondary instruction	18,120
29.	Lyceums and communal colleges	388,032
30.	Repayment by way of annuities to the treasuries of lyceums, colleges, and primary schools	260,000
31.	National scholarships and repayments	92,000
32.	Inspection of primary schools	84,311
33.	Normal schools	87,400
34.	Primary instruction, salaries, school buildings, encouragement, gratuities	868,544
35.	Primary instruction, adult classes, assistance, and various payments	172,776
	Total	2,796,372

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SPECIAL	Music.	Physics, Chemistry, or Mechanics.	Arithmetic and the Metric System.
	Music.	Morals.	Gymnastics.

Head Master of the School.

Friday	SPECIAL C	Linear Drawing.	Zoology, Hygiene, Anatomy.	Geometry.
	1st Class	History and Geography.	Morals.	Gymnastics
	2nd „	Music.	Morals.	Gymnastics.
	3rd „	History and Geography.	Reading.	
	4th „	Modelling.	Reading.	

Saturday	SPECIAL C	Revision and Interrogation.	Gymnastics.	Arithmetic and the Metric System.
	1st Class	Modelling.	Morals.	
	2nd „	Exercises of Memory.	Morals.	
	3rd „	Joiner's work and Forge.	Exercises of Memory.	
	4th „	History and Geography.	Exercises of Memory.	

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APPENDIX No. III.

EXTRACT from the "Annuaire" of PUBLIC INSTRUCTION and FINE ARTS for 1881.

CERTIFICATE OF PRIMARY STUDIES.

Students of the Primary Schools are permitted, on completion of their studies, to present themselves for examination for the certificate of primary elementary studies (*certificat d'études primaires élémentaires*). This title belongs exclusively to the diplomas conferred by the cantonal commissions, which commissions are appointed by the Rectors (of the academies), the names being submitted to them for the purpose, by the chief inspectors (*inspecteurs d'académie*) who meet every year, either in the principal town of the canton, or in some central commune, previously selected; the primary school inspector of the district being as a matter of course associated with them.

At the appointed date, and within the time prescribed by the chief inspector, every master or mistress prepares a statement for each school, giving a list of the candidates of both sexes for the certificate in question. This statement (which must not contain the name of any candidate who is less than 12 years of age on the first of October in the year in which the examination takes place) bears the name, christian name, date, and place of birth, present residence, and signature of each candidate; it is counter-signed and certified by the *maire* and forwarded at the proper time to the primary school-inspector.

The examination for the certificate of primary studies is composed of both written and oral tests.

The written tests which take place with closed doors under the superintendence of the members of the commission comprise, 1st, a dictation for spelling, of not more than 25 lines, which may at the same time serve as an examination in writing. 2nd, two questions in arithmetic, involving sums in calculation and the metric system with appropriate answers (*solution raisonnée*). 3rd, a composition of a simple kind (story, letter, &c.) Little girls have, in addition to this, to do some plain needlework under the supervision of a lady who is selected for this duty.

Failure in any one subject excludes the candidate. The maximum number of marks obtainable being fixed at 10 for each test, only those boys are permitted to take part in the oral examination who have obtained a minimum number of 20 marks (in spelling, writing, arithmetic, and composition); while girls must obtain at least 25 marks (in spelling, writing, arithmetic, composition, and needlework).

The oral tests, which take place in the presence of the masters and mistresses, comprise, 1st, explanatory reading; 2nd, the analysis of a sentence read out, or written on the black board; 3rd, the elements of the history and geography of France; and 4th, questions in practical applications of arithmetic and the metric system. Each of these subjects also may be marked from 0 to 10.

The marks awarded for the oral tests are added to those secured in the written examination, and no one is finally certified, as being qualified to receive the certificate, who has not received at least half the total number of marks obtainable in the two classes of tests; say a total of 40 marks in the case of the boys, and 45 marks in the case of the girls.

In addition to these subjects, the examination may include an exercise in outline drawing and questions in agriculture. Mention is made in the certificate of such supplementary subjects for which the candidate succeeds in obtaining not less than 5 marks.

No examination fees of any kind are payable.

(By decrees dated 16th of June, and the 24th of December, 1880, and circulars dated 27th September, 1880, and 27th January, 1881.)

APPENDIX No. IV.

MUNICIPAL APPRENTICESHIP SCHOOL

OF THE

BOULEVARD DE LA VILLETTE.

REPORT of the COMMISSION OF INSPECTION to the PREFECT of the SEINE.

MONSIEUR LE PRÉFET.

SIR,

By a decree, dated the 13th March 1880, you appointed a Commission of Inspection, in connexion with the first apprenticeship school, founded by the "Ville de Paris."

You decided upon this step in the belief that this school, which was established to solve a problem of the utmost importance, should receive the most assiduous care from the superior administrative authorities of the department; in order, also, that the problem might be solved in a manner which should justify the hopes of its founders; those of the municipal council which had readily voted the necessary funds; and those also of all persons animated by the patriotic desire of seeing nurseries of first class workers inaugurated.

In your opinion, Monsieur le Préfet, the municipal school of the Boulevard de la Villette should serve as a model for all those schools, with which Paris will eventually be endowed, if the experiment should prove successful, and for all those which will subsequently be created by the departments.

In order to further the success of this experiment, you decided that a Commission, formed of gentlemen, possessed of varied qualifications, and whose authority on questions of technical education was undeniable, should preside over the new establishment, and propose such improvements as would appear requisite for the most favourable solution of the problem.*

The Commission, thus constituted, set to work immediately.

During the period of nearly seven months that the Commission has been in existence, it has been able to observe how ingeniously the organisation of the manual work, and the plans for general education have been contrived. The Commission has also taken note of the weak points of the school, both in the practice of the manual work, and in the literary instruction. The Commission, Monsieur Le Préfet, herewith submits to you the results of these observations, together with its views concerning improvements which appear advisable.

First of all, it is desirable to describe briefly what gave rise to the idea of establishing a municipal apprenticeship school, and the purposes which this school is intended to serve.

For some years past all far-seeing persons had recognised the pressing need of founding a system of trade education. The rapid fall in the standard of value of working skill was not yet sufficiently understood, but it was known that, generally, apprenticeship to the various trades was on a most deplorable footing, both from a technical point of view, and also having regard to the morals of the apprentices.

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* The Commission is composed of Messieurs Nadaud, Deputy (President); Gréard, Vice-rector of the University; Tolain, Senator; Metivier and Thorel, Municipal Councillors; De Montmahou, Inspector General of Public Instruction; Clerc, Inspector of Elementary Education; Moutard, Professor at the School of Mines; Carré, Engineer; Bourdin, late Engineer; Delegate, Secretary, and Corbon, Senator reporter.

Without going back very far in order to find instances of the great antiquity of the system of combining the workshop with the school,* in order to develop, at the same time, both intellectual capacity and manual dexterity, and confining ourselves to contemporary examples, we may draw attention to the fact that the Constitution of 1848 contained in its 13th article, amongst other democratic promises, that of the creation of trade instruction. This fact is a strong proof that the desirability was felt at that time of forming schools of skilful workers. Since then Universal Exhibitions have made the necessity for the practical teaching of handicrafts more apparent than ever. The Government under the Empire, which was ambitious of inaugurating this teaching, fully understood its importance, but it was reserved for the Republic, when once definitely established, to realise the wish of all far-seeing people. Although several other towns have taken steps towards establishing workshop-schools, the "Ville de Paris" will nevertheless enjoy the honour of having taken the lead in this movement, the object of which is the integral education of the rising generation of young workmen, and an increase in the standard value of our national productions.

We had scarcely recovered from the fearful crisis through which we had passed, and whilst we had still to pay to our invaders the most colossal ransom ever imposed upon a conquered people, when the proposal for the introduction of technical training was formally embodied in a memorial presented to the then Prefect of the Seine, Mons. Léon Say. This was in December 1871, and the author of the scheme was the director of elementary education of this department, Mr. Gréard, now Vice-rector of the Academy of Paris, and a member of our Commission.

Thanks to the willingness of the authorities at the prefecture, and of the Municipal Council, a piece of land was purchased, containing buildings, which latter, after being hastily converted, enabled the promoters to open the school in January 1873.

The history of this interesting institution has been written by an eminent author, M. Alphonse Pagès, and is contained in a pamphlet to which we refer those who are desirous of precise information on the origin of the school.† We will merely state that, having opened with 17 pupils, the school contained 111 at the end of the first year, and that now there are 250. There would be many more, but for the lack of room to contain them.

The pupils are not admitted until they are thirteen years of age. A certificate of primary studies is required from them.‡ The apprenticeship is of three years' duration. During the first year the apprentices pass in succession through the various trades carried on in the establishment. They make a trial of each of them, in order to become acquainted with the general character of manual work, before adopting the particular trade best adapted to the temperament and aptitudes of each individual. After this first trial-year, the "rotation" having been completed, the pupil, paternally guided by the director of the workshops, chooses the trade he will devote himself to during his apprenticeship, in which the next two years are passed.

During the first two years the pupils pass six hours a day in the workshops, and four hours in the school, where they complete, or where they have the opportunity of completing, their elementary education. The pupils in the third year spend eight hours per day in the workshops, and two hours in the school.

Such is the mechanism of the institution. There is nothing absolute about it. The time spent in the workshop, or in school, might be prolonged or curtailed. This is a matter of experience, and the Commission accepts for the present as being satisfactory the manner in which the manual and intellectual exercises are apportioned.

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* From 1725 to 1745 there existed in a village of the Dauphiné a school where the master, assisted by his wife, had introduced manual work, and where the pupils were initiated according to their tastes, age, and dispositions into different kinds of industrial, as well as agricultural work. Later on, this same teacher, being in Brittany, addressed a most interesting memorial to the government of that province, to persuade them to establish there the ingenious system of education which he had for 40 years so successfully practised in the Dauphiné. For this information we are indebted to M. Jacques de Valserre.

† *Les écoles d'apprentis* by Alphonse Pagès, Libraire des Connaisances Utiles, 43, rue du Four-St.-Germain.

‡ See Appendix No. 5 (translator).

Before examining how this twofold plan of education is conducted, let us see what has been said, and long will be said, by way of objection to apprenticeship schools, by opponents of the system who, possessed of the spirit of routine, are very tenacious in their opinions. There are two principal objections made, the first would have it, that it is not in a school, but only in the *bonâ fide* workshop of a private manufacturer, that the apprentice can "pick up" the skill and knack (*tour de main*) of his trade, because it is only in this latter that he can have the opportunity of constantly watching how the men set about their work, and that nothing could take the place of this current practical instruction.

The other objection urged is that the time passed by the pupil in trying his hand at various trades, in order to discover the one for which he is best adapted, is time lost, and that the two following years, during which he is confined to a special trade, are insufficient to enable him to become a tolerably fair workman. To require another year still, they say, would be exacting too much from the parents, who have already made great sacrifices in order to support their children from the age of 13 or 14 years until they are 16 or 17 without their earning anything; and that, consequently, apprenticeship schools would not produce such results as their founders or patrons expected from them.

Such are the two principal objections. We will now proceed to show that the one is as groundless as the other.

If apprenticeships were now what they used to be formerly, when the trades were conducted on a small scale, and the master was himself a workman who took his part with the rest at "the job," aided only by a small number of journeymen, then the first objection would deserve some consideration. In those days the apprentice was frequently the master's own son or relation, or the son of a friend, or perhaps the son or relation of one of the journeyman, and in this latter case, perhaps the most frequent one, he was surrounded by those who were interested in his welfare; he was subjected to few evil influences, and he was taught his trade.

This condition of things, however, no longer obtains in the present day. It has disappeared little by little, in proportion as industry has become more developed. Small undertakings have given place to large ones, small workshops to immense factories. The masters are industrial captains, engineers, or capitalists, whose hands are mostly innocent of having handled a tool. Workmen are no longer the "companions" of the master, they are kept at a distance and subjected to severe restraint. Division of labour often reduces a man's work to one simple operation, to which it would be useless to apprentice a boy. Moreover, the firm does not care to train apprentices, and as a matter of fact the more important works no longer take them. In the large factories or works, where boys are employed, they are not taken with the object of teaching them a trade, but to make use of them for work of a simple kind, in the character of living machines until such time as iron machines take their place.

Apprenticeships are not of course entirely suppressed; the system is still in existence in these trades in which the small shops have not yet been swallowed up by the larger ones; but even in these small shops the effort to produce work, at the lowest possible cost and as speedily as possible, to the prejudice of quality, inevitably leads to division of labour and to a daily increase of specialisition, and hence the apprentice very seldom has an opportunity of learning how to turn out a complete piece of work.

One may say then that, with few exceptions, there is an end of real apprenticeship in private workshops. The few remaining apprentices are young labourers, rather than learners, and they grow up as labourers and nothing more.

We will go further, and say that if, by an impossibility, the heads of large industrial establishments imposed on themselves the duty of bringing up apprentices, they would have a difficulty in finding practitioners capable of teaching them. Precisely because, for a long time past, the custom of training apprentices has fallen into disuse, real workmen, who thoroughly understand their trade, are fast disappearing. This phenomenon is not peculiar to France; it occurs all over Europe and it is for this reason that men, well versed in matters of industry; in processes of production; and in the value of products are earnestly pressing for the contrivance of nurseries of young workmen.

If apprentices are no longer trained in private workshops, we must train them in the school.

We shall see by-and-by if it is possible to bring up apprentices, and to bring them up well, in the school; but the objection here raised does not hold good in the face of facts, it simply indicates, on the part of those who use it as an argument against workshop-schools, a most extraordinary ignorance of the condition of things which have already been proved a thousand times.

We will here make a digression, before dealing with the second objection. We have already referred to the subject of the division of labour. As this is constantly becoming more and more general, it may be asked whether there is any necessity for workmen, capable of understanding, and finishing a piece of work in its entirety. It may be said that a few foremen would suffice to "cut out" the work for a great number of men working at special parts, and that therefore, there is no occasion for anxiety on account of the sparcity of finished workmen.

This is not an opinion invented by us; it is one often expressed. We consider it worthless, and we must say why.

French manufactures owe their great reputation—a reputation already unfortunately compromised,—to products, the value of which arises out of the taste and dexterity (*tour de main*) of the workmen. But originality and ingenuity of design disappear when the work has to pass through a number of hands, each engaged only on some small detail.

Such work as this is called, in shop language, "slop-work" (*camelotte*) (*pacotille*). We are now speaking particularly of industries in which the hand and taste of the workman play an important part.

How are we to produce objects of originality and superior taste if we have no workmen capable of imagining and executing the article in its entirety? But even in the engineering trades it is of the greatest importance that a workman should be capable of conceiving and executing an entire machine. In point of fact machinery may yet be applied in numerous ways to human industry. We are, so to speak, only at the commencement of the era of what are known as machine tools, and a host of these ingenious mechanisms remain still to be invented and perfected.

It is an error to fancy that this is the business of the engineer alone. It is a matter of serious disadvantage that the engineer should not be, in case of need, also a practical workman, and on the other hand, that the practical man should not, to a certain extent, possess the knowledge of the engineer. The theorist who cannot make use of his hands, or execute what his mind has conceived, frequently falls into error, and is often also, incapable of making himself understood by the workmen. Nowhere, perhaps, so much as in France is the engineer separated so far from the practical workman, and this is much to be regretted. This is why we are so wofully distanced by other countries, particularly by the United States of America in the invention and construction of machine tools. This fact is beyond dispute; it has been shown at all International Exhibitions and notably at that of 1878 in Paris.

Much might still be said on this part of the question, but it is not our object here to write a treatise on trade instruction, and we think that the observations, already made, suffice to explain how necessary it is that we should rescue the industrial genius of France from the declivity, down which it has allowed itself to be dragged, and lose no time in founding schools where we may educate pupils, skilled in the handling of tools, and sufficiently endowed with general and special knowledge to enable them to become first-class workmen, and thus restore the value of workmanship to its proper level.

Let us now examine the second objection, that which consists in the allegation that the trials of the first year are so much time lost, and that the two following years are insufficient to constitute an adequate apprenticeship.

In the first place, is it a fact that the first year, which the pupil devotes to discovering his calling and to practising in turn the various trades is a year lost?

Secondly, is it not an error to suppose that, after the probation during the first year, the two following years are insufficient for a proper apprenticeship to the trade chosen?

As to the first point: Can it be doubted that, in our trade school, the pupil is infinitely better situated for the acquisition of technical knowledge then in the workshop of a private concern? We all know that in the private workshop, if they take apprentices (in the ordinary sense of the word) at all, their first year is spent in more or less disheartening drudgery, which leaves a bad impression on the whole of their working career, and which, at the best, is, in no sense, a serious preparation for the exercise of their trade. If there is a year lost, or worse than lost, for the young workmen, it is assuredly the first year they pass in the private shops; this is incontestable.

In our school, on the contrary, the first year is certainly fruitful. Beyond the fact that he is completing his elementary instruction, the pupil has not, so to say, to steal the secrets of the trade; we make it our duty to teach them to him. He is free from all drudgery and safe from all unhealthy influences. There are, then, as many advantages in passing the first year in the workshops of the school, as there are disadvantages, of all sorts in spending it in private shops.

This is however not all. During the few months of experience which the pupil has had of three or four different trades he has been enabled to acquire some knowledge of the particular processes employed in each of them, and not only will that which he has learnt not be forgotten, but these varied exercises will have opened out his intelligence, enlarged his professional ideas, developed his skilfulness and emboldened his mind, and they will unquestionably be of great service to him in the exercise of the trade which he finally adopts. Difficulties will embarrass him less; routine will take no hold of him; and he will be enabled all the better to effect improvements and even innovations.

Then if, during a trade crisis, work should fall off in the trade he has adopted, he will not be discouraged like the majority of his fellow-workmen under such circumstances; he will understand, better than they do, how to avert want and its sad consequences; he will take up another trade, one of those that he has already tried, the nearest approach to the one of his choice. For we may pause here to state that it is merely a wide spread prejudice that to change from one trade to another is an extremely troublesome and difficult matter, and inferior workmen, those who have not had the benefit of a sound apprenticeship, are those who are most affected by this false notion. It is also a very common opinion that workmen go on acquiring more skill all through their lives. This is not at all the case, or it is only so to a very limited extent. The fact is that, in all trades, the best and most skilful workmen are young men, and they do not gain in skill after a certain age, but are always, in their turn, outstripped by younger men who have had the rare opportunity of a good apprenticeship[*]. This is the rule, and the exceptions that may be brought forward only confirm it. It does not take so long, as is generally supposed, to create a good workman, provided that he has fallen into the right groove; that is to say, that the trade he has chosen is suitable both to his temperament and to his aptitudes, and that he has not at the outset been perplexed by imaginary difficulties and fallen into bad habits.

We will take advantage of this opportunity to remark that one of the essential conditions of good technical training is to assure the pupil that he will easily overcome the difficulties which appear formidable to him at first sight. The very reverse of this is generally done in private shops. The man, who has with difficulty learnt to work more or less well, is naturally inclined to impress on the apprentice the fact that the trade is a difficult one, and that a thorough knowledge of it is rarely attained. It is exactly the opposite course which should be followed in teaching all branches of human knowledge. To intimidate the mind and to exaggerate difficulties is a very common habit, particularly in workshops. This habit will certainly be introduced by the workmen-instructors into our apprenticeship schools. We have some reason to believe that it has already been introduced into the existing school, but the Commission will take the necessary measures to eradicate it.

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[*] A discussion took place at a meeting of the Commission on the question here raised. It was unanimously agreed that, in point of fact, a time arrives when the workman of reputed ability progresses no further, although he may still be in the prime of life. The reporter was inclined to fix 10 years as the limit of improvement. He was informed that, in certain trades the period might extend to 5 or even 10 years longer.

We may therefore conclude that, after the very necessary "rotation," of the first year, the two following ones should suffice to make a good workman; it being always understood that the pupil has been intelligently grounded in the practice of his chosen calling. Doubtless it will still be necessary for him, when he finds himself in the outside workshop, to improve himself in the handling of tools, and to adapt himself to the special practice of the firm for whom he is working. This may soon be accomplished, and in less than two years with his preparatory training, which is lacking to the majority of his fellows, he will become a first-class workman. If it should be otherwise, it will be because the instruction in the school has been badly conducted. It behoves us, therefore, to see that it is good, so that pupils may do credit to the school when they leave, and gradually elevate, from an industrial point of view, the standard value of handicraftwork.*

Now that, as we believe, we have answered the objections which ignorance or the spirit of routine oppose to the formation of apprenticeship-schools, let us see how the matter stands, and ought to stand, with regard to the ordinary school teaching at the school of the Boulevard de la Villette.

The late director of elementary education, M. Gréard, to whom the iniative of the founding of the above establishment is due, and the present director, M. Carriot, are entirely agreed as to the necessity that the class instruction should be purely and simply a continuation of that of the elementary school. They, as also all the members of the Commission, are of opinion that if the scope of the education of the pupils were enlarged, by the introduction of certain scientific studies, there would be a risk of the results being worthless, both to their intellectual and their working career. The pupils of our school are not sufficiently prepared for instruction of a scientific character and the long hours they must necessarily pass in the workshop, together with the exertions they are bound to make, both of body and mind, ill-dispose them to benefit by dry lessons, which, moreover, belong to the domain of what is styled "higher education."

Now we find that too much has been attempted in this direction, and that the limit has been exceeded, so much so, indeed, that a great portion of the school instruction "passed over the heads" of the pupils. This is a more serious fault than would appear at first sight. It is not only teaching thrown away, but also precious time wasted. The most serious part of the mischief, however, is its effect on the behaviour of the pupils. Comprehending nothing, or very little, of the meaning of the lessons, they gradually habituate themselves to wasting time, and they waste it in stealthy play; then gradually losing all respect for the master, they worry him by more or less offensive tricks. The bad practice acquired in one class is followed by the others. Superintendents are required to maintain order, and restraint becomes necessary, where sympathetic attention from the pupil to the master's word should reign. On the other hand, this necessity for superintendents for the maintenance of order is a certain sign that the teacher is unable to interest the pupil in his lessons.

The Commission took a very serious view of this condition of things, of which it only had information at a late period, and the bad effects of which the former authorities of the school appear not to have understood. The Commission referred the matter to the present director of elementary education for the department, to whose service it belongs, and also to his predecessor, to whom is due the merit of having proposed the foundation of the establishment on the Boulevard de la Villette. Both these gentlemen, without the least hesitation, expressed their opinion that the school instruction required to be remodelled. M. Gréard and M. Carriot are quite agreed with the Commission in saying that the lessons in the classes should only be simply a continuation of the elementary education.*

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* The training is already bearing good fruits, for the pupils easily find employment at good wages; two or three have become foremen, and the managers constantly receive requests for workmen, and letters of congratulation.

As respects the bad habits which have been acquired, it is upon the new director of the school that the delicate and serious duty devolves of inspiring the pupils with the necessity of profiting by their lessons, and of sympathetic respect for the masters. Much depends upon these latter to facilitate this task for him. It is absolutely necessary that the system of surveillance, that has been organised for some two or three years past, should become superfluous, and the Commission looks to the new director with every confidence to effect this.

Whilst wishing to see the teaching reduced to the proportions desired by the founders of the school, and which are perfectly reasonable, the Commission is nevertheless desirous that the pupils should receive instruction of a nature to excite their curiosity upon scientific subjects, and to make them feel the need of general information on history, geography, the laws of their country, &c., and on all those subjects which would complete the elementary education and fortify the mind. The Commission is anxious that the director should himself deliver, and when desirable, ask other persons to give familiar lectures to the lads on all subjects essential to an intelligent and healthy democratic education. The new director, M. Chabrier, is perfectly disposed to do this, and the authorities on whom he depends will certainly give him every support.

As regards technical teaching, this is well conducted by the director of the workshops, Mr. Bocquet, and the Commission has every confidence that he will go on improving. The Commission especially requests all members of the staff engaged in the education of the school, to abstain from pedantic dryness in lessons of all kinds, from coarse language, and from everything like harshness. The essential virtues of our directors, teachers, and foremen should be patience, kindliness, and friendly demeanour; in a word, all that is appreciated by children, and which commands their goodwill and sympathy. If we wish to be loved by the young we must show them that we love them. Thus we enter on the fruitful path of education by making it attractive. It is above all in our trade schools that this mode of instruction should be adopted. It shall be adopted. It is one of the conditions upon which their success depends.

Another element of success, to which the Commission attaches the greatest importance, is that the apprentices of the third, even those of the second year, should, as far as possible, turn out objects that are of use.

Practical instruction to be in earnest cannot be independent of actual production. Doubtless, in a school of very young people, one can only exercise them at first in the production, more or less imperfect, of things which are of no use; but we must, as far as possible, stimulate the zeal, and the desire of these young people to do well, in exercising them in the manufacture of things which can be put to some use.

We ask the Directors of the school always to bear in mind that the object is to produce good and ready workmen; we say intentionally both good and ready, for one may learn to work very well but slowly, as also one may learn to produce with rapidity but imperfectly. To solve the question of the school-workshop the two qualities must be united; "to work quickly and work well." The desired end will not be attained unless our young men, on leaving the school-workshops to enter those of private firms and to be employed as journeymen, do not work better and as quickly as ordinary workmen. If needful let us concede them a few months' practice to take a firm footing as workmen, and the requisite result must be obtained, or else they have been badly trained.

As regards the two years' practice, of which we have already spoken, we wish it to be understood that we consider those two years should suffice to make first class workmen. But is this result possible? Can it be obtained? The Commission is convinced that it can, but the possibility of obtaining these good results depends strictly on the employment of pupils on work which has been commissioned and is consequently intended for use.

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* The majority of the Commission proposed to suppress the English classes, as having so far produced no results of importance. By the desire of the school authorities, however, the Commission will postpone its decision on this point until after a new trial had been made.

Protracted and conclusive experiments have been made on the practice of teaching by means of work on objects not intended for use. The National Schools of Arts and Trades (*Écoles des Arts et Métiers*) are not productive. However the Superior Commission, instituted by the Ministry of Commerce and Agriculture, to re-organise the education in these schools recognised that it was a grave oversight not to exercise the pupils on work destined for actual use. No doubt it is possible to accustom them to turn out a piece of work to perfection, but the execution is sluggish and spiritless. In these schools time is of no value. The foremen have no motive for urging the pupils to make haste, as this would oblige them to hurry themselves. The execution is the only point which is considered, quite irrespective of cost.

For such schools as the "*Arts et Métiers*" which turn out foremen or managers, and not workmen properly so called, this objection, although it is a serious one, and one which has frequently been denounced, is not productive of such disastrous consequences for the future of the pupils.

But the evil is far more important when it concerns pupils who are intended to become workmen. If they do not learn the value of time in the school; if they have acquired the habit of working slowly; if they have not been incessantly stimulated by foremen who are alike interested in, and responsible for, the rapidity, as well as for the quality, of the work, they will inevitably retain, in their career as workmen, the habits of dilatoriness which they have contracted as pupils.

We cannot depend on the foremen if they are not alike, responsible for, as well as interested in, the good and rapid execution of the work. Without this condition they will take things easily and will not, either by word or example, exercise the necessary pressure on their pupils. It would be a very credulous person who would believe that it can be otherwise.

As repects the pupils themselves, they will have no heart in their work, unless it be ordered and actually used. They must even be rewarded and pecuniarily recompensed.

Without this condition we may indeed succeed in getting work properly done by the boys, but they will not put their energies into it; they will work sluggishly, and later on, when they become workmen, they will earn their living scantily and with difficulty.

These considerations, alone, should be decisive, but there are others to be taken into account upon which we may lay great stress.

We must first remember that the families from whence these children are drawn are many of them not well off, not to say poor. It is very hard upon these people to require them to maintain young people up to the age of 16 or 17, who bring nothing home, and require as much food as adults. The parents make these sacrifices in the hope that their children may become first class workmen; we must not disappoint their hopes.

There are others who cannot always maintain their children in this way, until the end, and who are obliged to take them away prematurely. This is in every respect very regrettable, and would not happen if the apprentices brought home some small wages, after the first year or 18 months.

If the school produced marketable goods it would receive payments.* The payments would not only afford the means of encouraging the pupils, by making them some pecuniary recompense, and thus set their families at greater ease, but we could also increase the number of foremen, among whom there would necessarily be emulation, and whose example would be profitable to the scholars.

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* Whenever the school has received payment for a piece of work ordered, it has been compelled to pay in the amount to the Municipal Treasury, which charges nothing to the school for the cost of the raw materials it employs. The Commission has been informed that it would give rise to certain objections if the school were turned into a kind of factory selling goods at a profit. It would perhaps be better and easier to open a credit for it on the Municipal Treasury for its expenses.

We may add that another advantage would consist in the reduction in the general expenses of the school, for, if the cost were reduced, there would be less hesitation in starting other schools.

The school of La Villette was not conceived and started for the benefit of some two or three hundred children, but, as was stated at the outset, it was intended to serve as a model for all those others which it is necessary to create. We must remember that there are, perhaps, in Paris alone, thirty or forty thousand youths, or more, who would require trade instruction, and if we do not endeavour to discover some plan of making these schools as inexpensive as possible, only a small number will be established; the children who are received in them will be a privileged few; and the problem would remain unsolved.

Fortunately everything is in favour of the adoption of the measure to which we have drawn attention. To produce, whilst imposing upon ourselves the duty of making things well and quickly, upon the same terms as private industry, but without unfair competition, is the means of creating enthusiasm (*entrain*) among the pupils; of giving them a recompense; of lessening in some degree the burden on their parents; and finally of reducing the general outlay. How is it possible to hesitate?

But there will be no hesitation. The authorities at the prefecture will certainly be of the same opinion in this matter as the Commission, and will have but to say a word to ensure of a portion of the work required for the service of the Ville de Paris, being ordered at our school, and paid for as it would be to a private firm. The director of primary instruction of the Seine, M. Carriot, having been consulted, is firmly convinced as to the necessity of turning out saleable work. This has also for a long time past been the conviction of the late inspector of the school, M. de Montmahou, who, under the inspiration of M. Gréard, so largely contributed to its foundation and organisation. Let us add that we may rely upon the co-operation, activity, and intelligent zeal of the chief of the work-shops, M. Bocquet. Finally the new administrative director, M. Chabrier, has no more sincere desire than that of realizing the project of making the school a productive one.

The Commission has therefore every confidence that the problem will be satisfactorily solved, and that the first school for apprentices, founded by the Ville de Paris, will be an excellent model for imitation.

For the Commission,
The Reporter,
A. Corbon (Senator).

P.S.—This report was in the press when the reporter had the opportunity of seeing at Havre a municipal apprenticeship-school which had been established there for more than 20 years, and which had been admirably reorganised. It is based on the best plan; is perfectly directed, and is giving the most satisfactory results. The City of Rouen likewise possesses an excellent apprenticeship school. Rheims has also a school well worthy of interest, but there the object is rather to make capable foremen than skilful workmen. Similar establishments exist at Lyons and in a number of other towns, and others are in course of formation.

APPENDIX No. V.

REPORT

TO

MONSIEUR LE SÉNATEUR, PRÉFET DE LA SEINE,

ON THE

ESTABLISHMENT OF APPRENTICESHIP SCHOOLS.

By H. TOLAIN (Senator).

Monsieur le Préfet,
Sir,

THIS (second) sub-commission was appointed to examine into the question of Apprenticeship Schools, and they unanimously recognised the necessity for establishing these useful institutions.

Various causes have, since the year 1789, successively contributed to lower the standard of technical knowledge and of manual dexterity among workmen. Formerly the classes organised by each trade association, and the execution of certain "master pieces," which were required both from the journeymen and from the master, constituted a system of true technical instruction, which, however, disappeared with the Revolution.

In some trades, it is true, the status of "journeyman" survives, but it has been, and still is, steadily on the decline; industrial changes and facilities of inter-communication are gradually tending to its total abandonment throughout France.

Division of labour, meanwhile, has become more developed every day, increasing the number of "specialties," until each operation is reduced to a trade of itself. Finally, the steam engine has conduced to the establishment of large factories, where the machine-tool plays the most important part, machine work gradually replacing hand-labour and transforming the artisan into a specialist, and the workman into a labourer. Such then are the causes which, to the great regret of our manufacturers, are steadily diminishing the numbers of skilful and intelligent workmen in all branches of industry and art manufacture.

Again, the workshops where private industries are conducted, no longer, except in a few rare instances, adopt the system of a true apprenticeship. The majority of manufacturers have given up taking apprentices; the lads they employ are set to a special class of work, often of the most insignificant kind; receive remuneration from the first; and by mutual consent of the parents and employer the contract of apprenticeship is abandoned for one of hire.

A revolution of this nature in the methods of production threatens above all the prosperity of French industry, and more particularly the welfare of that of Paris.

Among the trades and handicrafts, embracing art applied to industry and to objects of luxury, owing to the applications of science and the employment of machine tools, the articles produced assume a uniformity of character which diminishes, in a marked manner, their artistic value, and facilitates piracy and foreign imitation.

The Germans, the Belgians, the Americans, discover by means of new systems of working, and by the aid of improved tools, a means of appropriating to themselves, with little expense, patterns the production of which has often been very costly to our manufacturers.

These disadvantages are equally serious from a moral point of view. The workman, deprived of the most noble part of his calling (the creative portion of the work being from henceforth reserved for the engineer and the artist); his own ideas dispensed with; reduced to mere imitation; and condemned to labour of the most mechanical kind, falls by degrees into a species of mental sloth which renders him unfit for any intellectual effort. Labour soon becomes to him subjection to an aimless toil, from which he too frequently seeks to escape.

In view of this condition of affairs the Commission recognised that what was needed was not a system of technical education in favour of a privileged few, destined to become foremen or managers of works, but to raise the standard of theoretical and practical technical knowledge among all classes of workmen.

The Commission, having in view a generalised system of education applicable to both boys and girls, had to consider the financial aspect of the question. Doubtless it is the business of the municipal council to remove the inherent difficulties in the way of establishing new institutions, in accordance with the state of its finances, but notwithstanding the great resources of the city of Paris it is evident that we must proceed gradually, and the method to be adopted is not a matter of indifference.

In the first place we were enabled to establish the fact that the various industries carried on in Paris may be divided into two great categories; viz., parent industries and special industries. It is certain, for instance, that, for working in wood and iron, a systematic education, both theoretical and practical, would give to a lad leaving a municipal apprenticeship school, such as the school of La Villette, the opportunity of following several trades and specialties; whilst on the other hand workmen in such important industries in the clothing trades, as tailors, shoemakers, hatters, &c., are confined to their own respective special branches.

Now it is more particularly in the parent industries, comprising various trades or specialties, having numerous points of resemblance, the work in which is of a similiar character, and renders necessary, to a great extent, the same class of tools, that the system of apprenticeship is gradually disappearing; whilst employers are powerless to remedy the evil, however sincere may be their desire to do so. For these great industries, the only means of raising the standard of technical knowledge is the establishment of apprenticeship schools.

With these facts before us, a difficulty, however, still remained to be overcome. So long as hand labour, or speaking more accurately, the handling of the principal tools, forms no part of the education given in elementary schools, the apprenticeship schools will, in a great measure, be recruited in a haphazard way, since no opportunity will have been afforded for discovering the natural aptitudes of the pupils and determining their future vocations. Thus the education, however well organized, will not give such results as might otherwise reasonably be expected.

Without such preparation it is impossible to discover whether the pupil is specially fitted for work requiring precision or taste, for trades necessitating mathematical knowledge or artistic feeling. This difficulty is destined to be overcome by degrees, in proportion as manual work becomes extended in the workshops annexed to elementary schools (and by this means we shall certainly be able to shorten the term of apprenticeship by one year); this difficulty, however, must be encountered at the beginning, and may give rise in some minds to doubts as to the real value of the education to be obtained in apprenticeship schools.

Without departing from the principle already laid down, the Commission proposes to group together in the same apprenticeship school a certain number of trades; the programme of the school, whilst giving the same instruction during the first year to all the apprentices, would, in the second year, enable them to apply themselves specially either to works of precision or to those requiring artistic taste.

Inspired with this idea, the Commission proposes, by way of example, to establish an apprenticeship school for the furniture trades in the Faubourg

St. Antoine, which would produce workers in wood who, according to their natural aptitudes, would take up either the trade of a carpenter, a cabinet-maker, upholsterer, wood-carver, inlayer, &c.; and workers in iron, who would become locksmiths, men skilled in metal work for cabinet-makers and artistic lock makers. This example we consider sufficient to indicate the object to be aimed at with regard to each large branch of Parisian industry: viz., the grouping together of trades, which, at the commencement of the apprenticeship, would require the same theoretical and manual instruction, and would permit of the distribution, by successive selections of the apprentices in accordance with their aptitudes, amongst the trades which involve more especially the knowledge of science or of art. Such is the system which the Commission proposes to adopt for the parent industries.

It remained to determine what should be the conditions of admission to the new establishment. It was unanimously resolved that the admission should be absolutely free. A question then arose concerning the necessary qualification. Two plans were proposed; the first was that only those pupils should be admitted to the schools who held a certificate of primary studies;* the second only required the student to pass a special examination of a very elementary character.

Is it, indeed, certain, asked the partisans of the examination plan, that the certificate can be regarded as a guarantee of capacity for the exercise of a handicraft? Assuredly not; all the faculties do not follow the same general groove. Although there may be some so constituted that they can do nothing without having first mastered the reasons for their actions, there are many, in fact by far the greater proportion, who should begin by practice and not by theory. This is especially true in matters of education, where we often proceed from sensations to thoughts, from particular facts to general laws, to return later from the rule to its application.

To require the certificate of primary studies would be to limit the number of competitors, and to reserve these new schools for the children of the less needy classes; for those whose parents have been able to keep them at the elementary schools until they obtained their certificate.

All men, however, who had specially interested themselves in the question of elementary education were unanimous in declaring the beneficial results arising from the system of certificates. If the certificate were not made obligatory for admission into the apprenticeship schools, competent judges feared that the spirit of emulation would be weakened. That this distinction is a powerful stimulus to exertion is proved by the fact that the number of certificates distributed yearly is always increasing. These reasons appeared conclusive, and the obligatory production of the certificate was adopted by the Commission.

According to the calculations of a member of the Commission, Mr. C. Lucas, an architect who is fully competent to form an opinion, and who has devoted himself with the utmost attention to this question, it appears that the cost of establishing an apprenticeship school (without reckoning the site) would amount to a sum varying from 72*l.* to 80*l.* per apprentice, according as the number of apprentices varied from 100 to 300. It is necessary to observe that, in the opinion of the Commission, and according to Mr. Lucas' plans, the class-rooms and amphitheatres could be so arranged as to accommodate a number of students attending evening classes, double that of the apprentices.

Three special reports appended to the present one, concerning the three schools for boys which the Commission proposes to establish, contain detailed and precise information relating both to the programme to be followed and to the apparatus required. From these it would appear that, for the supply of both large and small tools, an average outlay of from 2*l.* to 2*l.* 8*s.* per apprentice would be necessary, according to the trade. Finally, the accounts of the school at La Villette show that the annual expenditure will amount to 10*l.* per apprentice.

As regards special trades the Commission is of opinion that the manufacturers should themselves take the initiative, and it observes with satisfaction that in several industries the employers have not awaited its advice, but have, in some instances, already established, or are ready to establish, workshops for apprentices, whilst others are engaged in organising classes to supplement the practice obtained in the workshop with theoretical instruction. In such cases, after having taken into consideration the programme adopted by the founders, and after having examined the guarantees given for the organisation of a sound apprenticeship, the municipal council might come forward with a grant, on condition that its supervision were accepted and made efficacious, and that the apprentices were selected from among the pupils who had passed through the workshop attached to the elementary school.

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* See Appendix No. 5 (Translator).

In the case of schools for boys, the Commission has confined its labours to three schemes. It would, indeed, have no further interest in continuing its enquiries if the municipal council were not to agree in principle to the proposed system.

The first would be a school of furniture and locksmith's work, situated in the Faubourg St. Antoine, comprising workshops for carpentry, cabinet-making, inlaying, chair-frame making, wood carving, builders' ironwork, cabinet lock, artistic lock making, &c. (Report of M. Cougny.—Appendix A.)

The second would be a school for engineers and wood-workers, to be established on the left bank of the Seine, after the model of the school of La Villette, but with certain additions which would permit of a larger field of instruction. These additions would comprise stone-cutting and working, timber construction, foundry work, also iron and tin-plate working, roofing, and plumbing; which would make of this school a thorough apprenticeship school for the building trades.

(Report of Mr. Henry Lepaute.—Appendix B.)

The third, to be situated in the centre of Paris, would combine the following specialties: scientific instruments, optical and mathematical instruments, telegraphic apparatus, small machinery, clock making, surgical instruments, &c. (See Mr. Bourbouze's Report, specially relating to Scientific Instruments.—Appendix C.)

The Commission would have accomplished but half its task if it had not considered the question of apprenticeship schools for girls; but as women's work does not present such diversity and so many complications as men's work, Messieurs E. Ferry, de Heredia, Marienval and Charles-Lucas, who have especially occupied themselves with this question, have drawn up one general programme which might be adopted in various quarters of Paris. (See Appendix D., data relating to the apprenticeship school for girls, collected by Mr. Charles Lucas.)

The Commission, as you will perceive from its report, wishes to make this apprenticeship school a school also for domestic training. Girls going into workshops at an early age accustom themselves afterwards only with much difficulty to domestic duties, and further, owing to the want of elementary knowledge of these subjects, they are unfitted to undertake them. We hope that the programme proposed will improve this condition of things.

The educational authorities ("*Direction de l'Enseignement*") have transmitted to us several other schemes for the establishment of apprenticeship schools, but as they differ too widely from the plan adopted by the Commission, we have, notwithstanding their undoubted merit, been unable to recommend them.

The same may be said of the private workshops for which a grant was asked from the municipal council.

In concluding, we have to tender our thanks to the officers of public instruction, who, by their intelligent zeal, have, in conjunction with the municipal council, succeeded in establishing the first apprenticeship school of the city of Paris: viz., the municipal school for apprentices in the Boulevard de la Villette. This school, like all new institutions, encountered certain difficulties at the beginning which were fortunately evercome.

The experience thus acquired ought to be made use of in establishing the new institutions, and we may therefore add the following remarks.

The majority of the children going into the apprenticeship schools will belong to parents with large families. Under these circumstances, goodwill alone on the part of the parents will not suffice to maintain the apprentice for three years without any remuneration whatever. It happens too often that a good apprentice, belonging to a poor family, may be compelled to quit the apprenticeship school at the end of the first or of the second year, that is, as soon as he has received sufficient instruction to enable him to earn something at a trade.

Industry would in this manner be supplied with imperfectly trained workmen in spite of the considerable sacrifices undertaken by the city of Paris. For these reasons, therefore, and prompted by the experience gained at the school of La Villette, the Commission deem it desirable to point out how the evils of a premature withdrawal from the apprenticeship school may be averted.

From the beginning of the second year the school might furnish gratuitously to all, or to a certain number of the apprentices, the mid-day meal, and in the third year add a small weekly remuneration. If the resources of the school permitted of this, a savings bank book, or a fixed sum, might be allowed to the apprentice, either to assist him till he can earn his living in a factory, or to enable him to provide himself with tools in the cases where this expense falls upon the workmen.

If the ideas herein set forth should be of value to the development and progress of industry, the Commission, Monsieur le Préfet, will have to thank you sincerely for the opportunity that has been afforded to it of being useful to its country.

(Signed) H. Tolain (Senator).

Note.—The special reports, plans, and estimates for the four schools above referred to will be annexed to a subsequent report of the Royal Commission on Technical Instruction.

APPENDIX No. VI.

Factory Law of May 19th, 1874.

On the Work of Children and Girls, who are Minors, employed in Industrial Occupations.

The National Assembly has adopted the law in the manner following:—

Section I.

Age of Admission.—Duration of Work.

Article 1.—Children and girls, who are minors, can only be employed upon industrial work in manufactories, mills, works, mines, workshops, and ateliers under the conditions laid down in the present law.

Article 2.—Children cannot be employed by manufacturers in factories, mills, works, ateliers, or workshops before the age of 12 years completed.

They may, however, be employed, from and after the age of 10 years completed, in certain industries, specially determined by a public administrative regulation, duly enacted by the Superior Commission, appointed in the manner herein-after set forth.

Article 3.—Children, until the age of 12 years completed, cannot be employed for a period of more than six hours daily, divided by a proper interval of rest. Above the age of 12 they may not be employed for more than 12 hours daily, divided by intervals of rest.

Section II.

Night-work:—Work on Sundays and Holidays.

Article 4.—Children cannot be employed on night-work of any description until they have attained the age of 16 years completed.

The same prohibition is applicable to the employment of girls who are minors, from 16 to 21 years of age, but only in works (*usines*) and manufactories.

All work between 9 o'clock at night and 5 o'clock in the morning is regarded as night-work.

However, in case of stoppage caused by an accidental interruption of an unavoidable kind, the above prohibition may be temporarily suspended, for a period determined by the Local Commission, or by the inspector hereinafter appointed, but without conveying the power of employing children of less than 12 years of age on night-work.

Article 5.—Children under 16 years of age, and girls under 21 years of age, cannot be employed in any kind of work for manufacturers on Sundays and the legal public holidays, not even for arranging and cleaning the workshops.

Article 6.—Nevertheless, in works carried on both by day and night (*à feu continu*), children may be employed on works of necessity (*travaux indispensables*) at night-time, or on Sundays and holidays.

Works in which this will be permitted, and the period of time while they may be carried on, will be determined by public administrative regulations.

This work will, under no circumstances, be authorised, excepting for children of at least 12 years of age.

Besides which, they must be allowed sufficient time and liberty to attend to the performance of their religious duties.

SECTION III.

Underground Work.

Article 7.—No child can be permitted to be employed in underground workings in mines, pits, or quarries before the age of 12 years completed.

Girls and women cannot be employed in such works.

The special conditions, imposed upon the work of children from 12 to 16 years of age, employed in underground workings, will be determined by public administrative regulations.

SECTION IV.

Primary Instruction.

Article 8.—No child, under 12 years of age completed, can be employed by any master unless his parents or guardian prove that he actually attends a public or private school. Every child admitted before 12 to work in a factory must, until he attains the age of 12, attend a school during certain hours in which he is not at work.

He must receive instruction for two hours daily at least, if a special school is attached to the manufactory.

The attendance at school must be certified by means of the production of a presence sheet (*feuille de presence*), prepared by the teacher and forwarded each week to the employer.

Article 9.—No child, before the age of 15 years completed, can be permitted to work for more than six hours each day, unless he is able to prove, by the production of the certificate of the teacher or primary inspector, countersigned by the *maire*, that he has acquired a sufficient amount of primary elementary instruction.

This certificate will be furnished gratuitously on a free form (*papier libre*).

SECTION V.

Supervision of Children.—Statutes for Workshops.

Article 10.—The *maires* are bound to furnish to the father, mother, or guardian a little book (*livret*) bearing the name and surname of the child, the date and place of his birth, his residence, and the time during which he has been at the school.

Managers of factories or employers must enter in the *livret* the date upon which the child was first employed in the factory, and the date of leaving. They must also keep a register, which must contain all the matters enumerated in the present article.

Article 11.—Managers or employers are bound to exhibit the text of the present law, and the regulations of public administration which relate to its execution, in every workshop.

Article 12.—Regulations of public administration will determine the different sorts of work which, owing to their dangerous character, or in consequence of overtasking the children's strength, are forbidden to children engaged in factories.

Article 13.—Children can only be employed in manufactories, classed in the official list among the unhealthy or dangerous establishments, upon the special conditions laid down in the regulations of public administration.

This prohibition shall be generally applicable to all occupations wherein the workman is exposed to processes or emanations which may be prejudicial to his health. Until the issue of these regulations it is forbidden to employ children of less than 16 years of age—

1st, in factories in which explosive materials are dealt with, and in those in which the manufacture of detonating compounds is carried on; such, for instance, as gunpowder, fulminating powder, &c., and all other substances exploded by a blow, or by contact with flame;

2nd, in factories designed for the preparation, distillation, or manipulation of corrosive substances or those of a poisonous nature, and such as evolve deleterious or explosive vapours.

The same prohibition applies to dangerous or unwholesome processes, such as—

The sharpening or dry-polishing of objects made of metal, of glass, or crystal;

The stamping or friction of the dry powder of carbonate of lead in the manufacture of red lead;

The dry-polishing of enamels, containing oxide of lead as a base, in the manufacture of so-called "muslin glass";

The silvering of mirrors by means of mercury;

Gilding by means of mercury.

Article 14.—The workshops must be maintained in a state of constant cleanliness, and be suitably ventilated. They must present all the conditions of safety and salubrity necessary for the health of the children.

In factories with machine-motors the wheels, the belts, the gearing, and all other apparatus, in any case in which it has been proved that they present any apparent danger, shall be so separated from the workpeople as only to be approachable for the purpose of attending to them. Well-holes, traps, and openings in floors must be properly covered.

Article 15.—Employers and chiefs of establishments must further see to the maintenance of good morals and the observance of public decency in their workshops.

SECTION VI.

Inspection.

Article 16.—Fifteen divisional inspectors shall be appointed to ensure the carrying out of the present law. The nomination of these inspectors shall be made by the Government from a list of names presented to them by the Superior Commission, instituted in the manner hereafter described. This list must contain the names of three candidates for each vacancy.

These inspectors shall be paid by the State.

Each divisional inspector shall reside and exercise his duties in such one of the territorial *circonscriptions* as is specified in the regulations of public administration.

Article 17.—Such candidates shall be qualified to hold the office of inspectors who possess the title of State engineer, or the diploma of a civil engineer; also the pupils who hold the diploma of the Central School of Arts and Manufactures, or of the School of Mines.

Those also shall be eligible who have already served for a period of three years at least as inspectors of the work of children (in factories), or who can prove that they have directed or superintended an industrial establishment, employing not less than 100 hands, for five years.

Article 18.—The inspectors have the right of entry into every manufacturing establishment, and into ateliers and workshops. They inspect the children, and may request to be shown the register, prescribed under Article 10, the *livrets*, the presence sheets at school, and the regulations of the factory.

Any breach of the regulations shall be certified by the written reports (*procès-verbaux*) of the inspectors, which shall be evidence until proof is forthcoming to the contrary.

When it relates to underground work, any breaches of the rules shall be concurrently certified by the inspectors or by the "mine guards" (*gardes mines*).

The formal reports shall be prepared in duplicate, one being sent to the Préfet of the Department, and the other being lodged in court (*déposé au parquet*).

In any case in which the inspectors perceive that any cause of danger or unhealthiness exists in an establishment or factory they shall take the opinion of the Local Commission, appointed as hereafter set forth, respecting this dangerous or unhealthy condition, and they shall record this opinion in a written report.

The above-mentioned proceedings do not abrogate the procedure of common law as respects the evidence and the prosecution for offences against the present law.

Article 19.—The inspectors shall forward a report each year to the Superior Commission, appointed as hereafter set forth.

SECTION VII.

Local Commissions.

Article 20.—Local Commissions shall be appointed in each department, whose office shall be unpaid. They are charged, 1st, with watching over the execution of the present law; 2nd, with the management of the inspection; 3rd, with the preparation of reports to the Préfet of the Department respecting the staff and the execution of this law, which reports shall be transmitted to the Minister, and communicated to the Superior Commission.

For this purpose the Local Commissions shall visit the various industrial establishments, factories, and workshops. They may, if they think fit, take with them a doctor.

Article 21.—The General Council will determine the number of the Local Commissions in each department, and the area under their charge; they must establish one at least in each arrondissement; they will establish them besides in the chief industrial and manufacturing centres, and wherever they may judge it necessary to do so.

The General Council may also name a special inspector, paid by the department; this inspector must in all cases act under the instructions of the divisional inspector.

Article 22.—The Local Commissions must be composed of not less than five nor more than seven members, named by the Préfet, from a list drawn up and presented by the General Council.

On each of such Commissions there should, if possible, be a Government engineer or a civil engineer, an inspector of primary instruction, and a mining engineer in mining districts.

The Commissions are appointed every five years; the retiring members are eligible for re-election.

SECTION VIII.

Superior Commission.

Article 23.—A Superior Commission, composed of nine members, whose office is unpaid, is established to act with the Minister of Commerce; this Commission is nominated by the President of the Republic; it is charged with—

1st. Watching over the uniform and vigilant execution of the present law.

2nd. Presenting its advice respecting the regulations to be made, and generally on the various questions relating to those under the protection of the Act.

3rd. Lastly, with the preparation of the list of candidates to be presented for nomination as divisional inspectors.

Article 24.—Each year the President of the Superior Commission will present a general report to the President of the Republic on the results of the inspection, and on the facts relating to the execution of the present law.

This report must be published in the official journal during the month in which it is presented.

The Government will each year give an account to the National Assembly respecting the execution of the law, and the publication of the regulations of public administration designed for its interpretation.

SECTION IX.

Penalties.

Article 25.—Manufacturers, directors, or managers of industrial establishments, and employers who have infringed against the provisions of the present law, and of the regulations of public administration relative to its execution, will be summoned before the correctional tribunal and punished with a fine of from 16 to 50 francs.

The penalty shall be payable for as many times as there may have been persons employed, contrary to the law, but without exceeding a total penalty of 500 francs.

In any case, however, the penalty shall not be enforced, providing that the manufacturer, director, or manager of the industrial establishment, or the owner of the workshop, shall prove that the infraction of the law has been due to an error caused by the production of birth certificates, *livrets*, or other certificates, containing false particulars, or belonging to some other person.

The provisions of Articles 12 and 13 of the law of June 22, 1854, relating to the *livrets* of workpeople, shall, in this case, be applicable to the authors of false statements.

The heads of manufacturing concerns are civilly responsible for sentences against their managers or agents.

Article 26.—If there is a repetition of the offence, the manufacturers, the directors, or managers of industrial establishments, and the masters of workshops, shall be condemned to pay a penalty of from 50 to 200 francs. The whole of the combined penalties, however, may not exceed a total of 1,000 francs.

It shall be considered a repetition of the offence if the offender has been sentenced for a first infringement of the law, or of the regulations of public administration which relate to its execution, within the 12 months preceding the case for which he is again tried.

Article 27.—The posting up of a notice of the sentence may, according to circumstances, but only in case of a second offence, be ordered by the correctional police tribunal.

The tribunal may likewise order that at the same time a notice of the sentence shall be inserted in one or more local papers, at the expense of the offender.

Article 28.—Proprietors of industrial establishments and masters of workshops who shall place any obstacle in the way of the inspectors to prevent them in the accomplishment of their duty, or who shall impede the members of commissions, doctors, engineers or experts, who may be appointed to visit the works, or to certify on any subject, shall be punished with a fine of from 16 to 50 francs.

Article 29.—Article 463 of the Penal Code is applicable in case of sentences pronounced in the execution of the present law.

The total amount of the penalties recovered by condemnations shall be paid into the subvention-fund, set apart for primary instruction in the budget of Public Instruction.

SECTION X.

Special Provisions.

Article 30.—Articles 2, 3, 4, and 5 of the present law are applicable in the case of children placed in apprenticeship and employed in industrial work.

The provisions of the above Articles, Nos. 18 and 25, shall be applicable to the said cases in so far as they modify the jurisdiction and the totals of the penalties indicated in the first paragraph of Article 20 of the law of Fèbruary 22, 1851.

The said law shall continue in force in all its other clauses.

Article 31.—As a transitory measure the provisions decreed in the present law shall only come into force one year after the date of its promulgation.

Provided that, at the said period, children, already legally admitted to work in factories, shall continue to be so employed under the conditions laid down in Article 3.

Article 32.—At the expiration of the above-mentioned interval all provisions contrary to the present law are and shall be revoked.*

Signed by the President,
L. BUFFET.

The secretaries—Félix Voisin, Francisque Rive, Louis de Ségur, E. de Cazenove de Pradine.

The President of the Republic promulgates this present law.
(Signed) MAL. DE MAC MAHON, duc DE MAJENTA.

The Minister of Agriculture and Commerce.
(Signed) L. GRIVART.

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* NOTE.—By the *projet de loi* on labour in factories, passed by the Chamber of Deputies on the 29th March 1881, and read a first time in the Senate, it is proposed to reduce the hours of labour of minors under 18 years of age, and of women, to 11 hours per day and to six days in each week.

N.B.—The hours of labour have already been reduced in some trades to 11½ hours, and in some even to 10 hours of effective work for all the hands, by agreement between the masters and the workpeople.

APPENDIX No. VII.

REPORT of a COMMISSION appointed to draw up a PROGRAMME for HANDICRAFT APPRENTICESHIP SCHOOLS.

To the Minister of Public Instruction and Fine Arts.

SIR, Paris, August 11th, 1881.

IN concert with the Minister of Agriculture and Commerce, you appointed a ministerial Commission, under date of May 31st, 1881, charged with the preparation of a scheme for a national graded school of higher primary and professional instruction, to be established conformably with the provisions of the law of the 11th December 1880.*

This Commission has today the honour of submitting to you the result of its deliberations.

The following is the tenour of the first article of the law of the 11th December 1880, relating to handicraft apprenticeship schools:—

"Apprenticeship schools, founded by communes or departments in
" order to develop the necessary dexterity and technical knowledge in
" young persons destined for manual occupations, are hereby placed in
" the category of establishments for primary instruction.

"Public schools for complementary primary instruction, the programmes
" of which include classes for professional instruction, are hereby assimi-
" lated to handicraft apprenticeship schools."

The law of the 11th December 1880 was prompted by the very just observation of its authors that the professional value of nearly all classes of workmen has appeared to be on the decrease in France for some time past. This deplorable state of things, which might be fraught with the gravest consequences for the future of our national industries, is in a great measure due to the various causes pointed out and discussed by M.M. Nadaud and Tolain in their reports to the Chamber of Deputies and to the Senate, viz.: that apprenticeship has, so to speak, ceased to exist in this country.

There is no means of remedying this defect other than by stimulating the creation of special professional schools in our various industrial centres for each chief branch of trade, which schools should be capable of replacing, and replacing even with advantage, that which apprenticeship was formerly for young people. The utility of founding similar establishments no longer requires proof, a considerable number of manufacturing towns have recognised this, and have taken, what must be regarded as, a praiseworthy initiative in this respect. It is for this purpose that the municipal school of the Boulevard de la Villette, and the clockmaking school have been founded in Paris; that Rheims has founded the municipal professional school in which dyeing, spinning, and weaving occupy an important place in the programme; that Nismes has established the school-workshop for the various textile fabrics which have made the fortune of the town; that Limoges has the school for ceramic decoration; and that Douai and Havre have been provided with apprenticeship schools. Such being the position of affairs, the law of the 11th December 1880 has the twofold aim, first, of forming in special apprenticeship schools, and distributing among the various trades, thoroughly trained workmen, well versed in their occupations; and second, of giving the requisite dexterity of hand, and sufficient technical knowledge, to young persons proposing to enter the special apprenticeship schools of the second class (*degré secondaire*).

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*The following are the members of this Commission:

M.M. Tolain (Senator), Member of the Superior Council of Technical Instruction, President; Girard, Director of Home Commerce at the Ministry of Agriculture and Commerce, Vice-President; De Bagnaux, Director of the Secretarial Department of the Accounts, in the same Ministry; F. Buisson, Inspector General for Primary Instruction, under the Ministry of Education; Jacquemart, Inspector General for the "Arts et Metiers" schools, and also for Technical Instruction, Reporter; Marguerin, formerly an administrator of the Paris Superior Primary Schools; De Montmahou, Inspector General for Public Instruction; Salicis, tutor at the Polytechnic School; Worms, Doctor of Medicine, on the staff of the Prefect of the Seine; and Debras, an Assistant Secretary in the Department for Primary Instruction, Secretary.

It is with this latter object in view, Sir, that you have decided upon the "foundation of a national school of superior primary instruction and of pro- "fessional training, preparatory to apprenticeship, which should serve as a "model for the establishments of a similar kind, which will be created "under the operation of the above law."* The Commission, named in the decree of the 31st May 1881, was charged with the preparation of a programme for this school.

The Commission was of opinion that an establishment of this kind should comprise an infant school, a primary school, and a superior primary and professional school; that in addition to these, with a view of preparing a staff capable of superintending the practical instruction conveyed in the schools, it would be advisable that the State should send a certain number of masters in training from the normal schools to spend a sufficient time in this school, to acquire the knowledge in which they are at present deficient.

It was also considered by the Commission that, owing to the special nature of the proposed group of schools, any attempt to make the handicraft teaching bear upon particular trades should be avoided.

The projected school would thus comprise—

1st. The infant school receiving children from 3 to 6 years of age.
2nd. The primary school for children between 7 and 12 years of age.
3rd. The superior primary school into which the children might be admitted from 12 to 14 years of age.
4th. The section of masters-in-training.

It became necessary to determine what would be the uninterrupted series of manual exercises which would be best calculated, if taught to the child throughout this period, to give to him (when the time came to leave the superior primary school) the requisite amount of dexterity of hand, combined with a sufficiency of technical knowledge.

The Commission believes that the programme appended to this report will answer this purpose.

As respects the infant school (from three to six years old), the introduction of the system of Frœbel, suitably extended and developed, will satisfy all the requirements of the general scheme of instruction.

At the age of seven the child enters the primary school, and stays there until the completion of its 12th year, that is to say, for a period averaging six years.

In order to apprehend more fully the nature of the manual exercises upon which children should be engaged in the primary school, it may be convenient to consider here the degree of knowledge which it is desirable they should possess on leaving the higher school.

The amount of theoretical knowledge, which would be indispensable, seems to us to be accurately laid down in the programme for superior primary schools, having a three years' course, which was fixed by the Ministerial Decree of the 15th January 1881. As concerns the practical knowledge which would be necessary, the Commission is of opinion that this might be acquired, under the conditions most favourable for children in the superior primary school, by means of a progressive course of handicraft-teaching which, while limited to two hours each day in the first year, should occupy almost the entire day in the third.

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* Decree of the 9th July 1881.

It results, from this observation, that it would not be absolutely necessary to put into the hands of children under 12 years of age the tools employed for working in wood and iron.

Nevertheless, there is reason to believe that, beginning from 10 years of age, the work in the shops would not be injurious if the instruction is suitably directed, and if care is taken to entrust to weak and inexperienced hands only such tools as are proportioned to the muscular powers of the pupil, and so selected as to have no prejudicial effect on the development of the bodily frame of the growing lad.

Children of 11 or 12 may therefore already be, to a certain extent, familiar with the majority of tools used in working wood, be able to work at the lathe and know how to hold a file, while skill and delicacy of hand will simultaneously be kept up by the practice of modelling in clay.

In the interval between 7 and 10 years of age all that must be attempted in the way of developing the manual dexterity of the child must be light tasks requiring little or no exercise of physical force. Drawing, cutting out patterns, joining together pieces of cardboard, in order to produce objects of various forms and colours, will at the same time fix his attention and evoke his intelligence and ingenuity.

To these works may be added the making of small objects in basket-work, and trellis work in wire, which will already need the employment of a light tool. It is essential at this age to employ the children in the genuine production of things which they may take home and show as their own handiwork. Certain of these objects, bearing the name of the pupil who made them, will remain at the school and constitute the basis of the school museum.

Between the ages of seven and ten modelling should already have taken its place among the school studies.

The child at length quits the primary school and enters the higher school. The most suitable age for this, if the future workman is considered, would seem to be that of twelve. The lad, leaving this latter school three years later, at the age of 15 or 16, would find himself in the most favourable position, either to enter a special professional school of the second degree, or to complete his training as rapidly as possible as a workman in the outside workshop.

The handicraft instruction of the superior primary school should, the Commission is of opinion, be based upon working in wood and iron. In fact, the work in these two materials offers an almost illimitable field for that general preparation, without any tendency towards specialization, which the pupils ought to obtain.

Working in wood and iron should be alternated in such a manner that, at the end of the year, the pupil should have been engaged in practical work in each of these two materials for two periods of 60 days each, in each of the two shops. These two kinds of work thus connected together would mutually supplement one another. In this way, having acquired a practical knowledge of wood-turning, the students could pass with increased advantage to metal-turning, and after having completed the construction of any kind of wooden framework he could far more easily understand the difficulties of joining two pieces of metal work.

In the superior primary school the course of drawing should consist during the first year in tracing in outline and flat-washing; the special aim of which should be to give precision and neatness of execution.

In the second year architectural drawing and ornament should be combined with the modelling. Sketching in free-hand should occupy a place of the utmost importance in this branch of teaching.

In the third year the teaching in drawing would consist mainly in sketching, and making finished drawings, with sections and dimensions, of the different tools and apparatus used in the workshops; the students' works being exclusively executed after drawings they themselves have made from such objects.

Such, Sir, are, as briefly as possible, the general ideas which have guided the Commission in the preparation of the programme which they have the honour of submitting for your examination.

As concerns the assistant masters of the normal schools, it has been considered advisable, for the time being, to defer this part of the question.

The President of the Commission,
H. TOLAIN
(Senator).

The Reporter,
P. JACQUEMART.

PROGRAMME.

INFANT SCHOOL.

Application and extension of the Froebel System. Education of the senses.

PRIMARY SCHOOL.

Manual exercises intended to develop the children's skill of hand.

Elementary Class.

(7 and 8 years old.) 1 hour per day.

Elementary exercises in freehand drawing, symmetrical arrangement of forms, cutting out pieces of coloured paper and applying them upon geometrical forms, exercises in colouring, cutting out geometrical forms in cardboard. Representations of geometrical solids. All these exercises to be done first on squared and subsequently on plain paper.

Small basket work. Arrangement of strips of coloured paper.

1st. In interwoven forms. 2nd. In plaited patterns.

Modelling—Reproductions of geometric solids and simple objects.

Intermediate Class.

(9 and 10 years old.) 1 hour per day.

Cutting out cardboard patterns, construction of regular geometric solids; construction by the pupils of cardboard models, covered with coloured drawings or coloured paper.

Small basket work; combinations of plaits; basket making.

Objects made of wire; trellis or netting; wire chain making.

Combination of wire and wood. Cages.

Modelling simple architectural ornaments.

Object lessons. Principal characteristics of wood and the common metals.

Upper Class.

(11 and 12 years old.) 2 hours per day.

Drawing and modelling. Continuation of the exercises in the preceding class. Repetition of the ornaments, previously executed, in the form of sketches with dimensions attached to them. Drawing the requisite sections for this purpose. Reproducing the sections as measured sketches. Study of the various tools used in working wood. Hammer, mallet, chisel, gimlet, centre-bit, brace, screwdriver, compasses, square, marking-gauge, saws of different kinds, jack-plane, trying plane, smoothing plane, files and rasps, level.

Theoretical and practical lessons on the above.

Plaining and sawing wood. Construction of simple joints.

Boxes nailed together or jointed without tacks.

Wood lathe. Tools used in turning. Turning simple geometrical forms.

Study of the tools used in working iron.—Hammer, chisel, cutting tool, cold chisel, squares, compass, files, &c. Theoretical and practical lessons concerning them.

Exercises in filing, smoothing, and finishing rough forgeings or castings (cubes, polygonal nuts).

The practical work in the shops in primary schools is to be followed by gymnastic exercises, in accordance with a special programme.

Superior Primary School.

The superior primary instruction given in the school will comprise the subjects specified in the following programme, as fixed by the Ministerial Decree of January 15th, 1881, for schools having a course extending over three years and more.

Morals.—The principals of morals. Duties and rights of the citizen. Elementary principles of political economy.

French language.—Methodical study of grammar and orthography. Etymology and derivation of words. Reading with proper emphasis and explanation of the meaning. Exercises in style and composition. Elements of the history of literature.

Writing.—Principles and practice of running-hand, round-hand, and commercial hand writing.

History.—Principal characters of antiquity. History of France up to the present day. Development of national institutions. Chief epochs of general history (ancient history, middle ages, and modern history).

Geography.—Physical and political geography of the five quarters of the world. Special study of the geography of France, comprising the divisions for administrative purposes. Economic geography. Map drawing.

Modern languages.—One modern language at least.

Mathematics.—First year: theoretical and practical arithmetic; first elements of ordinary geometry. Second year: advanced arithmetic; elements of algebra; plane geometry and its applications. Third and fourth years: principles of algebra as applied to the solution of simple equations; the elementary principles of rectilinear trigonometry as applied to the estimation of triangles; elementary principles of solid geometry and their application; the common curves.

Accounts.—First principles of commerce and account-keeping; book-keeping; current accounts bearing interest.

Physics.—The most important phenomena and the chief theories of physics. Modern discoveries and the applications of science to daily life.

Chemistry.—Exercises, involving the observation and examination of some of the familiar facts introductory to the study of chemistry. The metalloids and the most useful metals. The laws of chemistry. The elements of organic chemistry.

Natural History.—Organs and functions of men and animals. Practical study of the principal groups of animals and vegetables. Application of hygiene to the local industries. Principal facts of geology, and examination of the best known minerals.

Drawing.—Geometrical drawing. Lines, plane surfaces, elements of tinting. Solids. Obtaining the points of intersection in penetrations of solids and projections. Principles of perspective. Figured sketches. Essential parts of machinery and plans of buildings. Drawing from relief models and from the cast.

Singing.—Choirs with three parts.

Gymnastics.—Exercises in which all do alike. Exercises with apparatus. Military exercises.

Note.—The subjects in this programme are to be apportioned over the three years' course so as to apply in the best way to the requirements of the professional instruction.

PROFESSIONAL INSTRUCTION.

First Year.

(2 hours per day.)

Supplement to the Superior Primary Classes.

Drawing and modelling. Execution of the regular geometric solids of given dimensions from figured sketches.

Workshop teaching.

1st period.—Working in wood. A box. A drawing-board. A mortise and tenon joint. An oblique joint. A slit and tongue joint. A joint halved together obliquely. A St. Andrew's cross. Various kinds of scarfed joints.

2nd period.—Working in iron. Exercises with the file on an uneven piece of iron. Make rectangular parallelopiped with a square base of given dimensions. This to be converted into an octagonal prism; then into one with sixteen sides. This to be filed round. Then, in the lathe, to turn this into a cylinder of specified diameter, and finally to convert it into an hexagonal prism.

3rd period.—Working in wood. Various kinds of dovetail joints. Splices. Skew-splices, halved together (two kinds). Scarfs halved with dovetail pieces.

4th period.—Working in iron. Tool-making. Two rules in iron, of given dimensions. Two plain squares. A pair of callipers. Exercises with the lathe and the cutting chisel.

Second Year.

Supplement to the Superior Primary Classes.

Drawing and modelling. Execution of a graduated series of ornamental casts composed of elements of solid geometry, arranged systematically; rosettes, &c.

Work in the Shops.

3 hours per day.

First period.—Working in wood. Mortise and tenon to moulded work. Tenon for mitre joint. Mortise and tenon with champfered dovetail. Tongued joint with cross-ties. Mortice and tenon for quoins.

Second period.—Working in iron. An angle out of square. A pair of pointed compasses. A hand-vice.

Third period.—Working in wood. Angle open mortise-joint. Slit and tongue joint in two thicknesses of stuff. Stepped mortise and tenon. Square joint of two cylinders. Oblique joint of two cylinders. A pair of screw-clamps.

Fourth period.—Working in iron. Bit-pincers. Screw-wrench. Exercise with the lathe. Exercise with the cold-chisel.

THIRD YEAR.

Supplement to the Superior Primary Classes.

Drawing and modelling. Elements of architecture. Orders and styles.

Ornaments of the different orders and styles.

Industrial drawing. Theoretical principles of composition and of the arrangement of colours.

General principles of the application of drawing to pottery, to fret-cutting in wood and metal, to artistic locksmiths' work, and to the ornamental stamping of paper and fabrics.

Chemistry.—Experiments in the laboratory. Manipulation. Analyses. Mode of fixing colours (applied to pottery, stuffs, &c.)

Accounts.—Industrial account-keeping. Fixing of a scale of profits. Applying the same to the work of tools and simple machines.

Work in the Shops.

5 hours per day during the first six months, and 7 hours daily during the last six months.

First period.—Working in wood. The making of tools. Moulding block. Mitre block. Wood bench-clamp. Tenon saw. Small hand saw. Inlaying saw. A plane. Use of the wood lathe.

Second period.—Working in iron. The making of tools. A pair of steel squares, one of them to be a rim-square.—A tap-wrench.—Working with the cutting chisel.

Third period.—Working in wood. The making of tools. A plane, jack-plane, square, marking gauge, grooving-plane. Work with the lathe. Model making.

Fourth period.—Working in iron. Making a shifting gauge. Working at the forge. Elementary work. Making of tools, chisels, cross-cut chisels, boring bits, &c. Working at the lathe and with the cutting chisel.

Supplementary work in the shops.

After the end of the third year's course the pupils may, if they request it, be maintained at the establishment to work all day long in the shops throughout the holidays.

They will be paid wages for this work.

APPENDIX No. VIII.

LETTERS RESPECTING the TRAINING of APPRENTICES at the SCHOOL of the BOULEVARD DE LA VILLETTE.

SIR, Paris, 21st January 1882.

WE are in receipt of your favour of the 2nd instant, which refers to the "Ecole d'Apprentis," in the Boulevard de la Villette.

The Royal Commission on Technical Education do an honour to this firm in asking them the opinion which they may have formed generally of the instruction given in that school and also if they have found the boys trained there to be good and efficient workmen at the time of leaving the "Ecole d'Apprentis."

In reply, we beg to say that we find the boys trained at the Ecole de la Villette, to have a good idea of drawing, which enables them to understand the working drawings used in the works, but they are by no means efficient workmen; we find that the apprentices which are brought up to the trade in our own works or others are, age for age, far superior workmen to the boys trained at "La Villette."

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You are, no doubt, aware that there are, in Paris, evening classes of drawing at the "Conservatoire des Arts et Métiers," and at various establishments patronised by the Municipal Council and most of the "Mairies."

In our opinion, the workmen can obtain, and we know that some of our industrious young men have acquired at these classes, a sufficient knowledge of drawing, and we think that the practical part of the instruction which has to be taught to the apprentice is far better acquired *inside the works*, where machinery is daily produced.

We are at your disposal for any information we may know respecting these questions, and we beg you will excuse our delay in writing, which has been caused by an illness of the writer.

We remain, Sir,
Your obedient Servants,
G. Redgrave, Esq., (Signed) VARRALL, ELWELL, & MIDDLETON.
Secretary, Royal Commission
on Technical Education, London.

From the CHIEF ENGINEER of the LOCOMOTIVE and CARRIAGE DEPARTMENT of the Chemin de fer de l'Est.

SIR, Paris, 21st January 1882.

BY your letter of the 2nd January, you ask me for my general opinion of the Municipal Apprenticeship School of the Boulevard de la Villette, and of the workmen which it has formed.

I have the honour to inform you that, in my opinion, this institution is capable of supplying to industrial establishments persons suitably prepared and possessing the practical and theoretical knowledge necessary for becoming, in time, good workmen, provided they are placed in a suitable medium, under an active direction and under sufficient surveillance of their conduct; for it must be admitted that, taking the lower limit of the age of entrance, 13 years, the three years which they pass in the school are insufficient, and cast on the life of the workshop young people who are still children and are not sufficiently formed, as regards either character or trade knowledge, to be left entirely free; an additional year would appear to me to be indispensable in order to obtain workmen quite sure of themselves as regards their trade capacity, and able to resist bad advice.

As to the young people who, on leaving the school, have been admitted on our staff we believe that by continuing to improve themselves in our works they will in time take rank amongst the élite of our workmen.

Accept my compliments,
(Signed) J. REGRAY.

Gilbert Redgrave, Esq.

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